



# FX17/FX21 FLEX FLAIL

Published 02/11

Part NO. 00776900C

## OPERATOR'S MANUAL



This Operator's Manual is an integral part of the safe operation of this machine and must be maintained with the unit at all times. READ, UNDERSTAND, and FOLLOW the Safety and Operation Instructions contained in this manual before operating the equipment. C01-Cover



FCP-FL-0003

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**¡ATENCIÓN!**  
LEA EL INSTRUCTIVO



Si No Lee Ingles, Pida  
Ayuda a Alguien  
Que Se Lo Lea Para Que le  
Traduzca Las  
Medidas de Seguridad



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\$0.00

# To the Owner/Operator/Dealer

All implements with moving parts are potentially hazardous. There is no substitute for a cautious, safe-minded operator who recognizes the potential hazards and follows reasonable safety practices. The manufacturer has designed this implement to be used with all its safety equipment properly attached to minimize the chance of accidents.

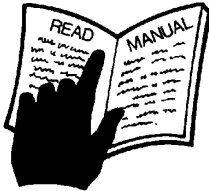
**BEFORE YOU START!!** Read the safety messages on the implement and shown in your manual. Observe the rules of safety and common sense!



# DANGER

FAILING TO FOLLOW SAFETY MESSAGES AND OPERATING INSTRUCTIONS CAN CAUSE SERIOUS BODILY INJURY OR EVEN DEATH TO OPERATOR AND OTHERS IN THE AREA.

1.



2. NO RIDERS, NO CHILDREN OPERATORS



3. USE SAFETY SHOES, HARD HAT, SAFETY GLASSES, SEAT BELTS, & ROPS



4. BLOCK UP SECURELY BEFORE WORKING UNDER.



1. Study and understand Operator's Manuals, Safety Signs, and Instructional Decals for tractor & flail mower to prevent misuse, abuse, & accidents. Practice before operating mower in a confined area or near passersby.

- Learn how to stop engine suddenly in an emergency. Be alert for passersby and especially children.

2. Allow no children on or near implement or tractor. Allow no riders on tractor or implement. Falling off can cause serious injury or death from being run over by tractor or mower or contact with Flail Mower Blades.

3. Operate only with tractor having Roll-Over Protective Structure (ROPS) and with seatbelt fastened securely and snugly to prevent injury and possible death from falling off or tractor overturn. Personal Protective Equipment such as Hard Hat, Safety Glasses, Safety Shoes, and Ear Plugs are recommended.

4. Block up or support raised machine and all lifted components securely before putting hands or feet under or working underneath any lifted component to prevent crushing injury or death from sudden dropping or inadvertent operation of controls. Make certain that area is clear before lowering or folding.

5. Before transporting, put Lift Lever in detent or full-lift position. Install Transport Safety Devices securely on folding implements. Slow down when turning and on hillsides.

- Install Restrictor in folding circuit to slow down lowering and unfolding if action is faster than is desirable.

6. Make certain that SMV sign, Warning Lights, and Reflectors are clearly visible. Follow local traffic codes.

7. Never operate with Flail Mower or Folding Section raised if passersby, bystanders or traffic are in the area to reduce possibility of injury or death from objects thrown by Blades under Shields or implement structure.

8. Before dismounting, secure flail mower in transport position or lower to ground.

- Put tractor in park position or set brake, disengage PTO, stop engine, remove key, and wait until noise of rotation has ceased to prevent entanglement in rotating parts which may cause injury or death.

- Never mount or dismount a moving vehicle. Crushing from runover may cause injury or death.

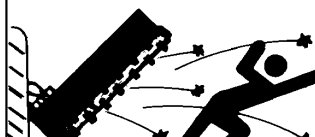
5. TRANSPORT SAFELY, LOCK UP.



6. USE SMV, LIGHTS, & REFLECTORS.



7. DO NOT OPERATE WITH MOWER OR WING RAISED.



8. DO NOT MOUNT OR DISMOUNT WHILE MOVING.



## WARRANTY INFORMATION:

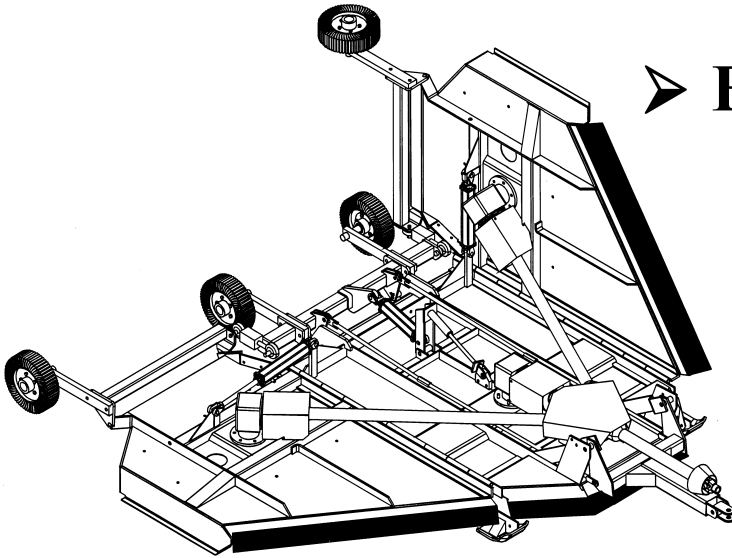
Read and understand the complete Warranty Statement found in this Manual. Fill out the Warranty Registration Form in full and return it to within 30 Days. Make certain the Serial Number of the Machine is recorded on the Warranty Card and on the Warranty Form that you retain.

➤ **BE SAFE!**

➤ **BE ALERT!**

➤ **BE ALIVE!**

➤ **BE TRAINED**  
**before operating**  
**the Mower!**



## *Safety Training Makes the Difference*

In order to reduce accidents and enhance the safe operation of mowers, *Alamo Group Ag Division*, in cooperation with other industry manufacturers has developed the AEM/FEMA Industrial and Agricultural Mower Safety Practices video and guide book.

The video will familiarize and instruct mower-tractor operators in safe practices when using industrial and agricultural mowing equipment. It is important that Every Mower Operator be educated in the operation of their mowing equipment and be able to recognize the potential hazards that can occur while operating a mower. This video, along with the mower operator's manual and the warning messages on the mower, will significantly assist in this important education.

Your Authorized *Rhino* Dealer may have shown this video and presented you a DVD Video when you purchased your mower. If you or any mower operator have not seen this video, **Watch the Video, Read this Operator's Manual, and Complete the Video Guidebook** before operating your new mower. If you do not understand any of the instructions included in the video or operator's manual or if you have any questions concerning safety of operation, contact your supervisor, dealer or *Alamo Group Ag*.

If you would like a VHS video tape of the video, please email [AEMVideo@alamo-group.com](mailto:AEMVideo@alamo-group.com) or Fax AEM VHS Video at (830) 372-9529 or mail in a completed copy of the form on the back of this page to AEM VHS Video 1502 E Walnut Street, Seguin, TX 78155. and request the VHS video version. Please include your name, mailing address, mower model and serial number.

Every operator should be trained for each piece of equipment (Tractor and Mower), understand the intended use and the potential hazards before operating the equipment.

The information and material listed above along with this Operator's Manual can assist you in meeting the OSHA requirement for Operator annual training.

### **OSHA TRAINING REQUIREMENTS**

**The following training requirements have been taken from Title 29, Code of Federal Regulations Part 1928.57 (a)(6). [www.osha.gov](http://www.osha.gov)**

Operator Instructions. At the time of initial assignment and at least annually thereafter, the employer shall instruct every employee who operates an agricultural tractor or implement in the safe operating practices and servicing of equipment with which they are or will be involved, and of any other practices dictated by the work environment.

**Alamo Group Ag. Division is willing to provide  
one (1) AEM Mower Safety Practices Video**

Please Send Me: ☐ VHS Format – AEM/FEMA Mower Operator Safety Video  
☐ DVD Format – AEM/FEMA Mower Operator Safety Video  
☐ Mower Operator's Manual  
☐ AEM Mower Operator's Safety Manual

Requester Name \_\_\_\_\_ Phone: \_\_\_\_\_

Requester Address: \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

Zip Code \_\_\_\_\_

Mower Model: \_\_\_\_\_ Serial Number: \_\_\_\_\_

Date Purchased: \_\_\_\_\_ Dealer Salesperson: \_\_\_\_\_

Dealership Name: \_\_\_\_\_ Dealership Location: \_\_\_\_\_

Mail to:

AEM Video Services

1502 E Walnut Street

Seguin, TX 78155

Or Fax to:

(830) 372-9529

Or Email to:

AEMVideo@alamo-group.com



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# **SAFETY SECTION**

Safety Section 1-1

# SAFETY

## General Safety Instructions and Practices

A careful operator is the best operator. Safety is of primary importance to the manufacturer and should be to the owner/operator. Most accidents can be avoided by being aware of your equipment, your surroundings, and observing certain precautions. The first section of this manual includes a list of Safety Messages that, if followed, will help protect the operator and bystanders from injury or death. Read and understand these Safety Messages before assembling, operating or servicing this Implement. This equipment should only be operated by those persons who have read the manual, who are responsible and trained, and who know how to do so responsibly.



The Safety Alert Symbol combined with a Signal Word, as seen below, is used throughout this manual and on decals which are attached to the equipment. The Safety Alert Symbol means: "ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!" The Symbol and Signal Word are intended to warn the owner/operator of impending hazards and the degree of possible injury faced when operating this equipment.

Practice all usual and customary safe working precautions and above all---remember safety is up to YOU. Only YOU can prevent serious injury or death from unsafe practices.



Indicates an imminently hazardous situation that, if not avoided, WILL result in DEATH OR VERY SERIOUS INJURY.



Indicates an imminently hazardous situation that, if not avoided, COULD result in DEATH OR SERIOUS INJURY.



Indicates an imminently hazardous situation that, if not avoided, MAY result in MINOR INJURY.



Identifies special instructions or procedures that, if not strictly observed, could result in damage to, or destruction of the machine, attachments or the environment.

**NOTE:** *Identifies points of particular interest for more efficient and convenient operation or repair.* (SG-1)

READ, UNDERSTAND, and FOLLOW the following Safety Messages. Serious injury or death may occur unless care is taken to follow the warnings and instructions stated in the Safety Messages. Always use good common sense to avoid hazards. (SG-2)



Si no lee ingles, pida ayuda a alguien que si lo lea para que le traduzca las medidas de seguridad. (SG-3)



# SAFETY



## WARNING

Engine Exhaust, some of its constituents, and certain vehicle components contain or emit chemicals known to the state of California to cause cancer and birth defects or other reproductive harm. (SG-30)



## WARNING

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the state of California to cause cancer, birth defects or other reproductive harm. (SG-31)

## Operator Safety Instructions and Practices



## WARNING

The rotating parts of this machine continue to rotate even after the PTO has been turned off. The operator should remain in the operator's seat for 60 seconds after the brake has been set, the PTO disengaged, the tractor turned off, and all evidence of rotation has ceased. (S3PT-10)

**"Wait a minute...Save a life!"**



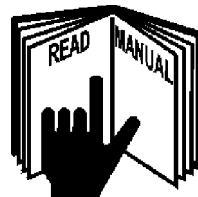
## DANGER

Never crawl under a raised Implement supported solely by the Tractor 3-Point hitch. Release of the control lever or mechanical failure will result in the Implement falling and possible injury or death. Always securely block up the Implement before crawling underneath to perform repairs and service. (S3PT-19)



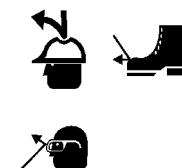
## DANGER

Never operate the Tractor or Implement until you have read and completely understand this Manual, the Tractor Operator's Manual, and each of the Safety Messages found in the Manual or on the Tractor and Implement. Learn how to stop the tractor engine suddenly in an emergency. Never allow inexperienced or untrained personnel to operate the Tractor or Implement without supervision. Make sure the operator has fully read and understood the manuals prior to operation. (SG-4)



## WARNING

The operator and all support personnel should wear hard hats, safety shoes, safety glasses, and proper hearing protection at all times for protection from injury including injury from items that may be thrown by the equipment. (SG-16)



# SAFETY

## SAFETY

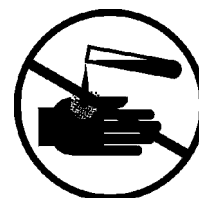
### CAUTION

PROLONGED EXPOSURE TO LOUD NOISE MAY CAUSE PERMANENT HEARING LOSS! Tractors with or without an Implement attached can often be noisy enough to cause permanent hearing loss. We recommend that you always wear hearing protection if the noise in the Operator's position exceeds 80db. Noise over 85db over an extended period of time will cause severe hearing loss. Noise over 90db adjacent to the Operator over an extended period of time will cause permanent or total hearing loss. **NOTE:** *Hearing loss from loud noise [from tractors, chain saws, radios, and other such sources close to the ear] is cumulative over a lifetime without hope of natural recovery.* (SG-17)



### WARNING

Always read carefully and comply fully with the manufacturer's instructions when handling oil, solvents, cleansers, and any other chemical agent. (SG-22)



### DANGER

KEEP AWAY FROM ROTATING ELEMENTS to prevent entanglement and possible serious injury or death. (SG-24)



### DANGER

Never allow children to play on or around Tractor or Implement. Children can slip or fall off the Equipment and be injured or killed. Inadvertent contact with controls can cause the Implement to shift or fall crushing themselves or others. (SG-25)

### DANGER

DO NOT use drugs or alcohol immediately before or while operating the Tractor and Implement. Drugs and alcohol will affect an operator's alertness and coordination and therefore affect the operator's ability to operate the equipment safely. Before operating the Tractor or Implement, an operator on prescription or over-the-counter medication must consult a medical professional regarding any side effects of the medication that would hinder their ability to operate the Equipment safely. NEVER knowingly allow anyone to operate this equipment when their alertness or coordination is impaired. Serious injury or death to the operator or others could result if the operator is under the influence of drugs or alcohol. (SG-27)



### WARNING

Prolonged operation may cause operator boredom and fatigue affecting safe operation. Take scheduled work breaks to help prevent these potentially impaired operating conditions. Never operate the Implement and Tractor in a fatigued or bored mental state which impairs proper and safe operation. (SG-32)

# SAFETY



## WARNING

Use extreme caution when getting onto the Implement to perform repairs, maintenance and when removing accumulated material. Only stand on solid flat surfaces to ensure good footing. Use a ladder or raised stand to access high spots which cannot be reached from ground level. Slipping and falling can cause serious injury or death. (SG-33)



## DANGER

DO NOT operate this Implement on a Tractor that is not properly maintained. Should a mechanical or Tractor control failure occur while operating, immediately shut down the Tractor and perform repairs before resuming operation. Serious injury and possible death could occur from not maintaining this Implement and Tractor in good operating condition.

(SG-36)



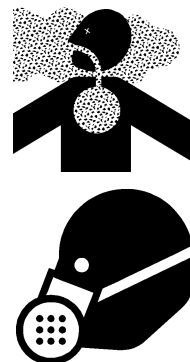
## WARNING

Avoid contact with hot surfaces of the engine or muffler. Use gloves and eye protection when servicing hot components. Contact with a hot surface or fluid can cause serious injury from burns or scalding. (SG-38)



## WARNING

Repeated or substantial breathing of hazardous dusts, including crystalline silica, could cause fatal or serious respiratory disease including silicosis. Concrete, masonry, many types of rock, and various other materials contain silica sand. California lists respirable crystalline silica as a substance known to cause cancer. Operation of this equipment under certain conditions may generate airborne dust particles that could contain crystalline silica. In those conditions, personal protective equipment including an appropriate respirator must be used. If excessive dust is generated, a dust collection or suppression system should also be used during operation. (SG-41)



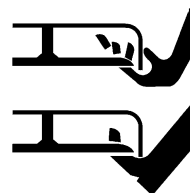
## WARNING

For your protection while operating or servicing equipment, wear relatively tight and belted clothing to avoid entanglement in moving parts. Tie up and protect long hair that could become entangled in machinery. Remove all jewelry including necklaces, rings and watches which can get caught in machinery or on corners or edges of the equipment. Serious injury can result from entanglement with the machinery. (SG-42)



## WARNING

Do not put hands or feet under mower decks. Blade Contact can result in serious injury or even death. Stay away until all motion has stopped and the decks are securely blocked up. (SGM-09)



## DANGER

Always keep a careful lookout and use extreme care when working around utility and municipal obstructions. Never allow the Mower to contact any utility, municipal, or other type structure. Clearly mark all mowing obstructions and consult local utility providers for a safe code of operation. (SPU-5)

# SAFETY



Do not operate the implement while wearing loose fitting clothing. Entanglement of the clothing with the rotating elements can result in serious injury or even death. Stay clear of all rotating elements at all times. (SSP-03)

## Equipment Operation Safety Instructions and Practices



Never leave the Tractor and Implement unattended while the Implement is in the lifted position. Accidental operation of lifting lever or a hydraulic failure may cause sudden drop of unit with injury or death by crushing. To properly park the implement when disconnecting it from the tractor, lower the stand and put the retaining pin securely in place, or put a secure support under the A-Frame. Lower the implement carefully to the ground. Do not put hands or feet under lifted components. (S3PT-1)



This Implement may be wider than the Tractor. Be careful when operating or transporting this equipment to prevent the Implement from running into or striking sign posts, guard rails, concrete abutments or other solid objects. Such an impact could cause the Implement and Tractor to pivot violently resulting in loss of steering control, serious injury, or even death. Never allow the Implement to contact obstacles. (S3PT-12)



Be sure you have adequate knowledge of the property you will be working on. Take time to make yourself aware of any area underground lines or cables. Contact with buried lines or cable could result in **serious injury** or **death**. If in doubt about buried utility lines call 811 before digging or 1-800-258-0808. (SBH-6)



Do not operate Mower if excessive vibration exists. Shut down PTO and the Tractor engine. Inspect the Mower to determine the source of the vibration. If Mower blades are missing or damaged replace them immediately. Do not operate the mower until the blades have been replaced and the Mower operates smoothly. Operating the Mower with excessive vibration can result in component failure and broken objects to be thrown outward at very high velocities. To reduce the possibility of property damage, serious injury, or even death, never allow the Mower to be operated with blades missing. (SFL-4)



There are obvious and hidden potential hazards in the operation of this Mower. REMEMBER! This machine is often operated in weeds and in heavy grass. The Blades of this Mower can throw objects if shields are not properly installed and maintained. Serious injury or even death may occur unless care is taken to insure the safety of the operator, bystanders, or passersby in the area. Do not operate this machine with anyone in the immediate area. Stop mowing if anyone is within 100 yards of mower. (SFM-1)





# SAFETY

## **⚠ DANGER**

Rotary Mowers are capable under adverse conditions of throwing objects for great distances (100 yards or more) and causing serious injury or death. Follow safety messages carefully



**STOP MOWING IF PASSERSBY ARE WITHIN 100 YARDS UNLESS:**

- Mower Deck Shielding, and Discharge Deflector are installed and in good, working condition;
- Mower section is running close to and parallel with the ground without exposed Blades;
- Passersby are outside the existing thrown-object zone;
- All areas have been thoroughly inspected and all foreign material such as rocks, cans, glass, and general debris has been removed.

**NOTE:** Where there are grass and weeds high enough to hide debris that could be struck by the blades, the area should be: inspected and large debris removed, mowed at an intermediate height, inspected closely with any remaining debris being removed, and mowed again at desired final height. (This will also reduce power required to mow, reduce wear and tear on the Mower drivetrain, spread cut material better, reduce streaking, and make the final cut more uniform). (SFM-3)

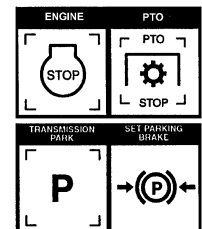
## **⚠ WARNING**

Operate this Equipment only with a Tractor equipped with an approved roll-over-protective system (ROPS). Always wear seat belts. Serious injury or even death could result from falling off the tractor--particularly during a turnover when the operator could be pinned under the ROPS. (SG-7)



## **⚠ DANGER**

**BEFORE** leaving the tractor seat lower the implement, set the parking brake and/or set the tractor transmission in parking gear, disengage the PTO, stop the engine, remove the key, and wait for all moving parts to stop. Place the tractor shift lever into a low range or parking gear to prevent the tractor from rolling. Never dismount a Tractor that is moving or while the engine is running. Operate the Tractor controls from the tractor seat only. (SG-9)



## **⚠ DANGER**

Never allow children or other persons to ride on the Tractor or Implement. Falling off can result in serious injury or death. (SG-10)



## **⚠ WARNING**

Do not mow with two machines in the same area except with Cab tractors with the windows closed. (SGM-11)

# SAFETY

## SAFETY

### **WARNING**

Do not mount or dismount the Tractor while the tractor is moving. Mount the Tractor only when the Tractor and all moving parts are completely stopped. (SG-12)



### **DANGER**

Start tractor only when properly seated in the Tractor seat. Starting a tractor in gear can result in injury or death. Read the Tractor operators manual for proper starting instructions. (SG-13)



### **WARNING**

Do not operate this Equipment with hydraulic oil or fuel leaking. Oil and fuel are explosive and their presence could present a hazard. Do not check for leaks with your hand! High-pressure oil streams from breaks in the line could penetrate the skin and cause tissue damage including gangrene. To check for a hose leak, SHUT the unit ENGINE OFF and remove all hydraulic pressure. Wear oil impenetrable gloves, safety glasses and use Cardboard to check for evidence of oil leaks. If you suspect a leak, REMOVE the HOSE and have it tested at a Dealer. If oil does penetrate the skin, have the injury treated immediately by a physician knowledgeable and skilled in this procedure. (SG-15)



### **DANGER**

Never run the Tractor engine in a closed building or without adequate ventilation. The exhaust fumes can be hazardous to your health. (SG-23)

### **WARNING**

Do not exceed the rated PTO speed for the Implement. Excessive PTO speeds can cause Implement driveline or blade failures resulting in serious injury or death. (SG-26)

### **DANGER**

Operate the Tractor and/or Implement controls only while properly seated in the Tractor seat with the seat belt securely fastened around you. Inadvertent movement of the Tractor or Implement may cause serious injury or death. (SG-29)

### **WARNING**

In case of mechanical difficulty during operation, place the transmission in the park position, set the parking brake, shut down all power, including the PTO and the engine and remove the key. Wait until all rotating motion has stopped before dismounting. (SG-39)

# SAFETY

## **WARNING**

Do Not operate this equipment in areas where insects such as bees may attack you and/or cause you to lose control of the equipment. If you must enter in such areas, use a tractor with an enclosed Cab and close the windows to prevent insects from entering. If a tractor cab is not available, wear suitable clothing including head, face, and hand protection to shield you from the insects. Attacking insects can cause you to lose control of the tractor, which can result in serious injury or death to you or bystanders. Never dismount a moving tractor. (SG-40)

## **WARNING**

Mow only in conditions where you have clear visibility in daylight or with adequate artificial lighting. Never mow in darkness or foggy conditions where you cannot clearly see at least 300 feet (90 m) in front and to the sides of the tractor and mower. Make sure that you can clearly see and identify passersby, steep slopes, ditches, drop-offs, overhead obstructions, power lines, debris and foreign objects. If you are unable to clearly see these type of items discontinue mowing. (SGM-1)

## **DANGER**

There are obvious and hidden potential hazards in the operation of this Mower. REMEMBER! This machine is often operated in heavy brush and in heavy weeds. The Blades of this Mower can throw objects if shields are not properly installed and maintained. Serious injury or even death may occur unless care is taken to insure the safety of the operator, bystanders, or passersby in the area. Do not operate this machine with anyone in the immediate area. Stop mowing if anyone is within 300 feet of mower. (SGM-02)



## **DANGER**

The rotating parts of this machine have been designed and tested for rugged use. However, the blades could fail upon impact with heavy, solid objects such as metal guard rails and concrete structures. Such impact could cause the broken objects to be thrown outward at very high velocities. To reduce the possibility of property damage, serious injury, or even death, never allow the cutting blades to contact such obstacles. (SGM-4)

## **WARNING**

Extreme care should be taken when operating near loose objects such as gravel, rocks, wire, and other debris. Inspect the area before mowing. Foreign objects should be removed from the site to prevent machine damage and/or bodily injury or even death. Any objects that cannot be removed must be clearly marked and carefully avoided by the operator. Stop mowing immediately if blades strike a foreign object. Repair all damage and make certain rotor or blade carrier is balanced before resuming mowing. (SGM-05)



## **WARNING**

Many varied objects, such as wire, cable, rope, or chains, can become entangled in the operating parts of the mower head. These items could then swing outside the housing at greater velocities than the blades. Such a situation is extremely hazardous and could result in serious injury or even death. Inspect the cutting area for such objects before mowing. Remove any like object from the site. Never allow the cutting blades to contact such items. (SGM-06)

# SAFETY

## SAFETY

### **WARNING**

Mow at the speed that you can safely operate and control the tractor and mower. The correct mowing speed depends on terrain condition and grass type, density, and height of cut. Normal ground speed range is from 2 to 5 mph(3-8 kph). Use slow mowing speeds when operating on or near steep slopes, ditches, drop-offs, overhead obstructions, power lines, or when debris and foreign objects are to be avoided. (SGM-07)

### **WARNING**

Avoid mowing in reverse direction when possible. Check to make sure there are no persons behind the mower and use extreme care when mowing in reverse. Mow only at a slow ground speed where you can safely operate and control the tractor and mower. Never mow an area that you have not inspected and removed debris or foreign material. (SGM-08)

### **WARNING**

Do not mow with two machines in the same area except with Cab tractors with the windows closed. (SGM-11)

### **WARNING**

Follow these guidelines to reduce the risk of equipment and grass fires while operating, servicing, and repairing the Mower and Tractor:



- Equip the Tractor with a fire extinguisher in an accessible location.
- Do Not operate the Mower on a Tractor with an underframe exhaust.
- Do Not smoke or have an open flame near the Mower and Tractor.
- Do Not drive into burning debris or freshly burnt areas.
- Ensure slip clutches are properly adjusted to prevent excessive slippage and plate heating.
- Never allow clippings or debris to collect near drivelines, slip clutches, and gearboxes. Periodically shut down the Tractor and Mower and clean clippings and collected debris from the mower deck. (SGM-12)

### **DANGER**

The Mower is designed for certain mowing applications and is rated to cut up to a specific size vegetation (see Mower Standard Equipment and Specifications). DO NOT use this mower to cut vegetation above the Mower's rated capacity or to cut any type of non-vegetative material. Only operate this Mower on a properly sized and equipped Tractor. Operating this Mower in an application for which it is not designed and/or operating the Mower with the wrong size Tractor can cause Mower component damage and equipment failure resulting in possible serious injury or death. (SGM-14)

### **WARNING**

Do not operate or pull the mower into standing water. When uplift or fan type mower blades contact water they can be severely deflected downward causing possible failure of blade resulting in serious injury to the operator or bystanders. (SGM-15)

# SAFETY

## DANGER

Use extreme caution when raising the Mower above ground level. Stop the Blades from turning when the Mower is raised and passersby are within 100 yards. Raising the Mower exposes the Cutting Blades which creates a potentially serious hazard and can cause serious injury by objects thrown from the Blades or by contact with the Blades. (SPU-1)

## DANGER

Rotary Mowers are capable under adverse conditions of throwing objects for great distances (300 feet or more) and causing serious injury or death. Follow safety messages carefully.



### **STOP MOWING IF PASSERSBY ARE WITHIN 300 Feet UNLESS:**

- Front and Rear Deflectors, Chain Guards, or Bands are installed and in good, workable condition;
- Mower sections or Wings are running close to and parallel to the ground without exposed Blades;
- Passersby are outside the existing thrown-object zone;
- All areas have been thoroughly inspected and all foreign material such as rocks, cans, glass, and general debris has been removed.

**NOTE:** *Where there are grass and weeds high enough to hide debris that could be struck by the blades, the area should be: inspected and large debris removed, mowed at an intermediate height, inspected, closely with any remaining debris being removed, and mowed again at desired final height. (This will also reduce power required to mow, reduce wear and tear on the Mower drivetrain, spread cut material better, reduce streaking, and make the final cut more uniform).* (SRM-01)

## DANGER

Do not turn so sharp or lift mower so high to produce a severe "knocking" of the Driveline which will cause accelerated wear and breakage of drive train components and could result in possible injury from the separated Driveline sections. (SRM-04)

## WARNING

Do not let the Blades turn when the Mower Deck is raised for any reason, including clearance or for turning. Raising the Mower deck exposes the Cutting Blades which creates a potentially serious hazard and could cause serious injury or even death from objects thrown from the Blades. (SRM-07)



# SAFETY

## Connecting or Disconnecting Implement Safety Instructions and Practices

### **DANGER**

**DO NOT** use a PTO adapter to attach a non-matching Implement driveline to a Tractor PTO. Use of an adapter can double the operating speed of the Implement resulting in excessive vibration, thrown objects, and blade and implement failure. Adapter use will also change the working length of the driveline exposing unshielded driveline areas. Serious bodily injury and/or equipment failure can result from using a PTO adapter. Consult an authorized dealer for assistance if the Implement driveline does not match the Tractor PTO.

(S3PT-14)

### **DANGER**

Always shut the Tractor completely down, place the transmission in park, and set the parking brake before you or anyone else attempts to connect or disconnect the Implement and Tractor hitches. (S3PT-15)

### **WARNING**

Never operate the Tractor and Mower if the Implement input driveline is directly connected to the Tractor transmission. Tractor braking distances can be substantially increased by the momentum of the rotating Mower blades driving the Tractor transmission even though the Tractor clutch has been disengaged. Install an over running clutch between the Tractor PTO and the Mower driveline to prevent this potentially dangerous situation. (S3PT-16)

### **WARNING**

When attaching the Implement input driveline to the Tractor PTO, it is important that the connecting yoke spring activated locking collar slides freely and the locking balls are seated securely in the groove on the Tractor PTO shaft. Push and pull the driveline back and forth several times to ensure it is securely attached. A driveline not attached correctly to the Tractor PTO shaft could come loose and result in personal injury and damage to the Implement. (S3PT-17)

### **WARNING**

Before operating the Implement, check to make sure the Implement input driveline will not bottom out or become disengaged. Bottoming out occurs when the inner shaft penetrates the outer housing until the assembly becomes solid-it can shorten no more. Bottoming out can cause serious damage to the Tractor PTO by pushing the PTO into the Tractor and through the support bearings or downward onto the PTO shaft, breaking it off. A broken driveline can cause personal injury. (S3PT-18)

# SAFETY

## SAFETY

### Transporting Safety Instructions and Practices



Be particularly careful when transporting the Implement with the Tractor. Turn curves or go up hills only at a low speed and using a gradual steering angle. Rear mounted implements move the center of gravity to the rear and remove weight from the front wheels. Make certain, by adding front ballast, that at least 20% of the tractor's weight is on the front wheels to prevent rearing up, loss of steering control or Tractor tip-over. Slow down on rough or uneven surfaces to prevent loss of steering control which could result in property damage or possible injury. Do not transport unless 3-Point lift lever is fully raised and in the latched transport position. Dropping implement in transport can cause serious damage to the tractor and/or Implement and possibly cause the operator or others to be injured or killed.

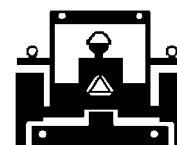
(S3PT-02)



Allow sufficient clearance for the Implement to swing outward while turning. Implements carried behind the Tractor will swing outside the tire path when making turns. Contacting a solid object while turning will cause equipment damage and possible injury. (S3PT-20)



Make certain that the "Slow Moving Vehicle" (SMV) sign is installed in such a way as to be clearly visible and legible. When transporting the Equipment use the Tractor flashing warning lights and follow all local traffic regulations. (SG-6)



# SAFETY

## SAFETY

### **WARNING**

Transport only at speeds where you can maintain control of the equipment. Serious accidents and injuries can result from operating this equipment at high speeds. Understand the Tractor and Implement and how it handles before transporting on streets and highways. Make sure the Tractor steering and brakes are in good condition and operate properly.



Before transporting the Tractor and Implement, determine the proper transport speeds for you and the equipment. Make sure you abide by the following rules:

Test the tractor at a slow speed and increase the speed slowly. Apply the Brakes smoothly to determine the stopping characteristics of the Tractor and Implement. As you increase the speed of the Tractor the stopping distance increases. Determine the maximum transport speed not to exceed 20 mph (30 kph) for transporting this equipment.

Test the equipment at a slow speed in turns. Increase the speed through the turn only after you determine that the equipment can be operated at a higher speed. Use extreme care and reduce your speed when turning sharply to prevent the tractor and implement from turning over. Determine the maximum turning speed for you and this equipment before operating on roads or uneven ground.

Only transport the Tractor and Implement at the speeds which allow you to properly control the equipment.

Be aware of the operating conditions. Do not operate the Tractor with weak or faulty brakes or worn tires. When operating down a hill or on wet or rain slick roads, the braking distance increases: use extreme care and reduce your speed. When operating in traffic always use the Tractor's flashing warning lights and reduce your speed. Be aware of traffic around you and watch out for the other guy. (SG-19)



### **DANGER**

Be particularly careful when transporting the Implement using the tractor. Turn curves or go up or down hills only at a low speed and at a gradual steering angle. Make certain that at least 20% of the tractor's weight is on the front wheels to maintain safe steerage. Slow down on rough or uneven surfaces. (STI-01)

### **WARNING**

Only tow the Implement behind a properly sized and equipped Tractor which exceeds the weight of the Implement by at least 20%. DO NOT tow the Implement behind a truck or other type of vehicle. Never tow the Implement and another Implement connected in tandem. Never tow the Implement at speeds over 20 MPH. (STI-06)





# SAFETY

## Maintenance and Service Safety Instructions and Practices

### DANGER

Make sure the PTO shield, integral driveline shields, and input shields are installed when using PTO-driven equipment. Always replace any shield if it is damaged or missing. (S3PT-8)



### WARNING

Relieve hydraulic pressure prior to doing any maintenance or repair work on the Implement. Place the Implement on the ground or securely blocked up, disengage the PTO, and turn off the tractor engine. Push and pull the Remote Cylinder lever in and out several times prior to starting any maintenance or repair work. (S3PT-09)

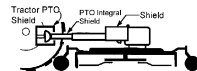


### DANGER

Always disconnect the main PTO Driveline from the Tractor before performing service on the Implement. Never work on the Implement with the tractor PTO driveline connected and running. Rotating Parts, Blades or Drivelines could turn without warning and cause immediate entanglement, injury or death. (S3PT-11)

### DANGER

All Safety Shields, Guards and Safety devices including (but not limited to) - the Discharge Deflectors, Steel Guards, Gearbox Shields, Belt Shields, and PTO Shields should be used and maintained in good working condition. All safety devices should be inspected carefully at least daily for missing or broken components. Missing, broken, or worn items must be replaced at once to reduce the possibility of injury or death from thrown objects, entanglement, or blade contact. (SFM-2)



### WARNING

Always maintain the safety signs in good readable condition. If the safety signs are missing, damaged, or unreadable, obtain and install replacement safety signs immediately. (SG-5)

### WARNING

Do not modify or alter this Implement. Do not permit anyone to modify or alter this Implement, any of its components or any Implement function. (SG-8)

### DANGER

Never work under the Implement, the framework, or any lifted component unless the Implement is securely supported or blocked up to prevent sudden or inadvertent falling which could cause serious injury or even death. (SG-14)



### WARNING

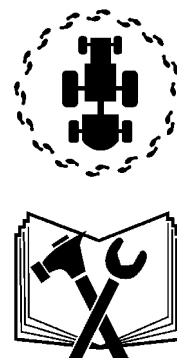
Never attempt to lubricate, adjust, or remove material from the Implement while it is in motion or while tractor engine is running. (SG-20)

# SAFETY

## SAFETY

### **WARNING**

Periodically inspect all moving parts for wear and replace when necessary with authorized service parts. Look for loose fasteners, worn or broken parts, and leaky or loose fittings. Make sure all pins have cotter pins and washers. Serious injury may occur from not maintaining this machine in good working order. (SG-21)



### **DANGER**

Do Not fill fuel tank while engine is running. Refuel only after engine has cooled down. If fuel is spilled, move machine away from the area of the spill and avoid creating any source of ignition until the gasoline has evaporated. (SG-28)

### **WARNING**

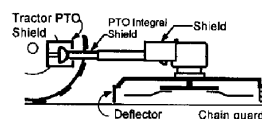
Perform service, repairs and lubrication according to the maintenance section. Ensure the unit is properly lubricated as specified in the lubrication schedule and all bolts and nuts are properly torqued. Failure to properly service, repair and maintain this Implement in good operating condition could cause component failure and possible serious injury or even death. (SG-35)

### **WARNING**

Use caution and wear protective gloves when handling sharp objects such as blades, knives, and other cutting edges. Be alert to worn component surfaces which have sharp edges. Sharp surfaces can inflict severe laceration injuries if proper hand protection is not worn. (SG-37)

### **DANGER**

All Safety Shields, Guards and Safety devices including (but not limited to) - the Deflectors, Chain Guards, Steel Guards, Gearbox Shields, PTO integral shields, and Retractable Door Shields should be used and maintained in good working condition. All safety devices should be inspected carefully at least daily for missing or broken components. Missing, broken, or worn items must be replaced at once to reduce the possibility of injury or death from thrown objects, entanglement, or blade contact. (SGM-3)



### **DANGER**

Replace bent or broken blades with new blades. NEVER ATTEMPT TO STRAIGHTEN, WELD, OR WELD HARDFACING ON BLADES SINCE THIS WILL LIKELY CRACK OR OTHERWISE DAMAGE THE BLADE WITH SUBSEQUENT FAILURE AND POSSIBLY CAUSE SERIOUS INJURY FROM THROWN BLADES. (SGM-10)

### **WARNING**

DO NOT weld or repair rotating mower components. Welds and other repairs may cause severe vibration and/or component failure resulting in part being thrown from the mower causing serious bodily injury. See your Authorized Dealer for proper repairs. (SGM-13)

# SAFETY

## PARTS INFORMATION

Rhino mowers use balanced and matched system components for blade carriers, blades, cuttershafts, knives, knife hangers, rollers, drivetrain components, and bearings. These parts are made and tested to Rhino specifications. Non-genuine "will fit" parts do not consistently meet these specifications. The use of "will fit" parts may reduce mower performance, void warranties, and present a safety hazard. Use genuine Rhino mower parts for economy and safety. (SPRM-1)

## SEE YOUR RHINO DEALER



Be sure you have adequate knowledge of the property you will be working on. Take time to make yourself aware of any area underwater or underground lines or cables. Contact with buried lines or cable could result in serious injury or death. (STL-1)



In wet conditions where there is a likelihood of material collecting on the Implement, make certain that this material is removed before traveling on public roadways. (STL-7)

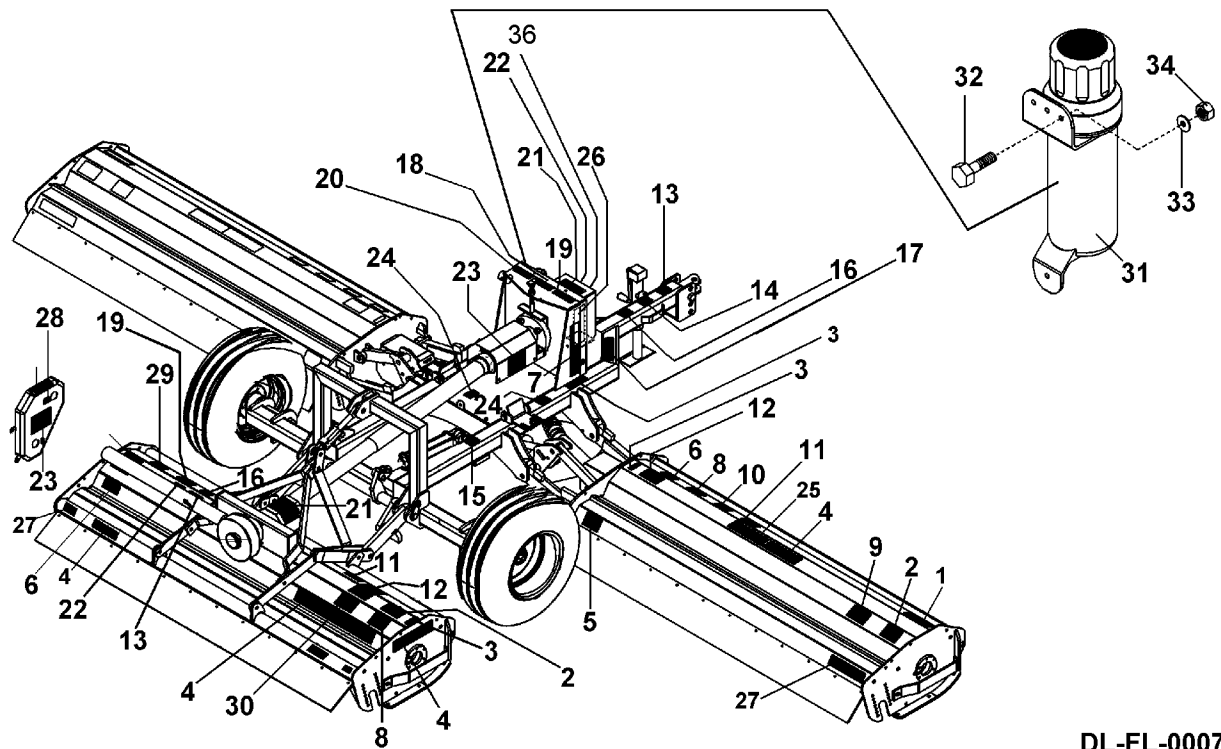
In addition to the design and configuration of this Implement, including Safety Signs and Safety Equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence, and proper training of personnel involved in the operation, transport, maintenance, and storage of the machine. Refer also to Safety Messages and operation instruction in each of the appropriate sections of the Tractor and Equipment Manuals. Pay close attention to the Safety Signs affixed to the Tractor and Equipment. (SG-18)

SAFETY

# SAFETY

## Decal Location

**NOTE:** Rhino supplies safety decals on this product to promote safe operation. Damage to the decals may occur while in shipping, use, or reconditioning. Rhino cares about the safety of its customers, operators, and bystanders, and will replace the safety decals on this product in the field, free of charge (Some shipping and handling charges may apply). Contact your Rhino dealer to order replacement decals.



DL-FL-0007

# SAFETY

## SAFETY

ITEM	PART NO.	QTY	LEVEL	DESCRIPTION
1.	1458393	2	REFLECT	Yellow Reflector
2.	02967668	3	DANGER	Thrown Objects
3.	00777058	N/A	SER PLATE	Serial Plate FX21
	00777059	N/A	SER PLATE	Serial Plate FX17
4.	D301	4	LOGO	Rhino
5.	02962765	4	DANGER	Pinch Points
6.	000108	3	INSTRUCT	Operating Instructions
7.	00776749	3	NAME	Flex Flail
8.	D536	3	INSTRUCT	Height Adjustment
9.	002369	3	DANGER	Multiple Hazard
10.	00753840	2	DANGER	Folding Wings
11.	002425	3	DANGER	Front Shield
12.	00725739	3	WARNING	Repair Shields
13.	00725746	2	PELIGRO	Get Manual Translated
14.	D102	1	INSTRUCT	Drawbar-to-PTO Distance
15.	00756059	1	DANGER	Leak Detection
16.	D103	2	WARNING	540 RPM PTO
17.	00763536	2	WARNING	Disengage
18.	00758194	2	WARNING	Pinch Point Belt
19.	00763977	2	INSTRUCT	Notice to Owner
20.	00760657	1	IMPORTANT	Genuine Rhino Parts
21.	00756494	2	DANGER	D/L Multiple Hazard
22.	00773723	2	PELIGRO	Driveline Translation
23.	D302	3	LOGO	Rhino
24.	02962765	2	DANGER	Pinch Points
25.	00776748	2	NAME	Flex Flail 21
25A.	00776747	2	NAME	Flex Flail 17
26.	00775933	1	WARNING	Guard Missing
27.	1458392	4	REFLECT	Red Reflector
28.	000678	2	INSTRUCT	Grease Fitting Inside
29.	02964510	1	IMPORTANT	Genuine Parts
30.	001830	1	INSTRUCT	Lubrication Chart
31.	00776031	1	-----	Canister, Operators Manual
32.	10058000	3	-----	Bolt
33.	00024100	3	-----	Flatwasher
34.	02959924	3	-----	Locknut
35.	00776900C	1	-----	FX17/FX21 Operators Manual
36.	00777394	1	WARNING	Tow
37.	03200347	1		SMV Symbol
38.	D518	1	WARNING	Jack Positioning

### Decal Sheets

Decal Sheet #00776745 Includes Items - 2, 4, 6, 7, 8, 9, 11, 12, 13, 16, 18, 21, 22, 23, 28, 29, 30

Decal Sheet #00776744 Includes Items - 2, 4, 5, 6, 7, 8, 9, 10, 11, 25, 25A

Decal Sheet #00776899 Includes Items - 5,13,14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26

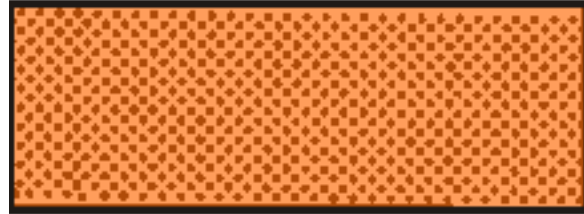
# SAFETY

## SAFETY

### Decal Description

Amber Reflector. Keep reflectors clean and visible.

P/N 1458393



**DANGER! - Keep Away - Thrown Objects.** Inspect area before mowing. Do not let rotating blades contact solid objects. Operate only if all Guards - Deflectors are in place. Do not operate with Mower or Wing raised off the ground. Stop mowing if Passerby enter the area. Stay away from rotating blades. Keep hands and feet away from rotating blades. Do not approach mower until all movement has stopped.

P/N 02967668



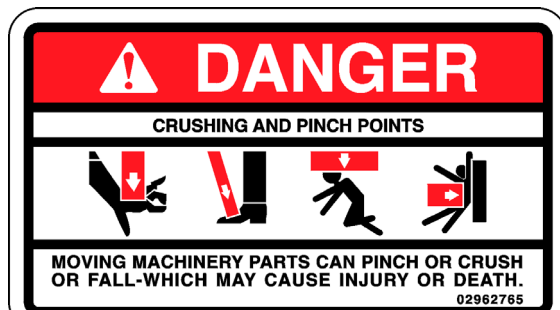
RHINO LOGO



P/N D301

**DANGER! Crushing and Pinch Points.**

Moving machinery parts can pinch or crush or fall-which may cause injury or death.



P/N 02962765

# SAFETY

Instructions to properly lubricate and check mower for potential problems prior to operation.

P/N 000108

**OPERATING INSTRUCTIONS**

This Mower will give long satisfactory service with a minimum of upkeep cost if the following procedure is followed:

1. KEEP PROPERLY LUBRICATED
  - a. BEARINGS - Use a lithium-based #2 Bearing Grease such as Shell Alvania #2, Sinclair Litholene, Mobil BRB, Texaco Marfak #2, Standard Stanolith #57, etc.
  - b. GEARBOX - Use SAE EP90 oil.
2. KEEP FASTENERS TIGHTENED
  - a. Normally, if Fasteners loosen after being properly tightened, the Mower is vibrating more than is acceptable and permanent damage can occur rapidly.
  - b. See Bolt Chart for proper tightening torque.
3. KEEP THE MOWER RUNNING SMOOTHLY AND QUIETLY.
  - a. After hitting any obstruction and at the first sign of any unusual vibration or noise, STOP THE MOWER, and do not operate again until the problem is found and corrected. VIBRATION CAN DESTROY THE ENTIRE MOWER IN A SHORT TIME.
  - b. Inspect for broken or missing Knives, Knives restricted from swinging freely, worn Bearings, a bent Shaft, or other conditions causing out-of-balance rotation.
  - c. See Operators Manual for details on causes and correction of vibration of Flail Mowers.

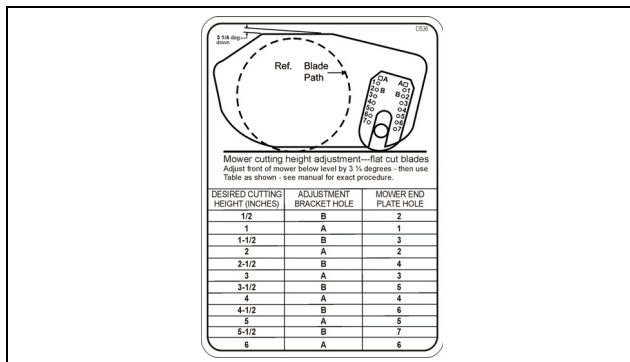
**NOTICE:** Warranty does not cover damage resulting from the failure to observe these reasonable procedures. 000108

FLEX FLAIL NAME LOGO



P/N 00776749

Cutting Height Adjustment Chart



P/N D536

SAFETY

# SAFETY

Danger! Mult-Hazard Warning. Failing to follow these Safety Messages and Operating Instructions can cause serious bodily injury or even death to operator and others in the area.



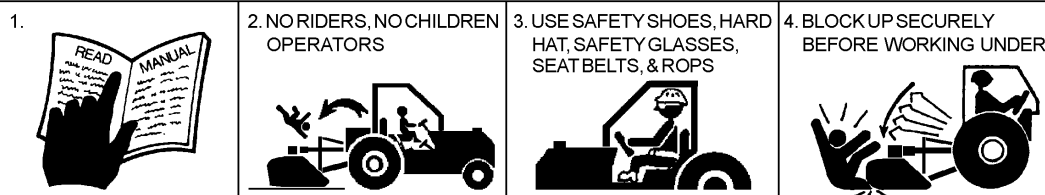
P/N 002369

SAFETY

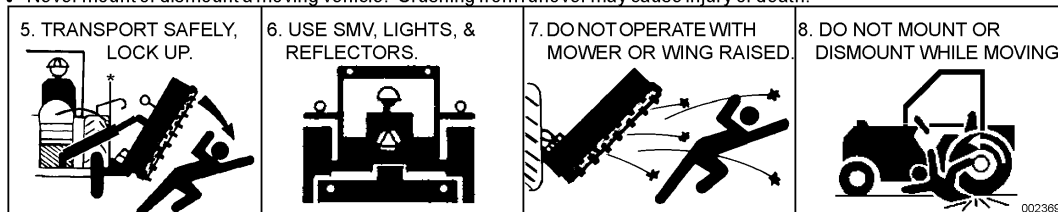


# DANGER

FAILING TO FOLLOW SAFETY MESSAGES AND OPERATING INSTRUCTIONS CAN CAUSE SERIOUS BODILY INJURY OR EVEN DEATH TO OPERATOR AND OTHERS IN THE AREA.



1. Study and understand Operator's Manuals, Safety Signs, and Instructional Decals for tractor & flail mower to prevent misuse, abuse, & accidents. Practice before operating mower in a confined area or near passersby.
  - Learn how to stop engine suddenly in an emergency. Be alert for passersby and especially children.
2. Allow no children on or near implement or tractor. Allow no riders on tractor or implement. Falling off can cause serious injury or death from being run over by tractor or mower or contact with Flail Mower Blades.
3. Operate only with tractor having Roll-Over Protective Structure (ROPS) and with seatbelt fastened securely and snugly to prevent injury and possible death from falling off or tractor overturn. Personal Protective Equipment such as Hard Hat, Safety Glasses, Safety Shoes, and Ear Plugs are recommended.
4. Block up or support raised machine and all lifted components securely before putting hands or feet under or working underneath any lifted component to prevent crushing injury or death from sudden dropping or inadvertent operation of controls. Make certain that area is clear before lowering or folding.
5. Before transporting, put Lift Lever in detent or full-lift position. Install Transport Safety Devices securely on folding implements. Slow down when turning and on hillsides.
  - Install Restrictor in folding circuit to slow down lowering and unfolding if action is faster than is desirable.
6. Make certain that SMV sign, Warning Lights, and Reflectors are clearly visible. Follow local traffic codes.
7. Never operate with Flail Mower or Folding Section raised if passersby, bystanders or traffic are in the area to reduce possibility of injury or death from objects thrown by Blades under Shields or implement structure.
8. Before dismounting, secure flail mower in transport position or lower to ground.
  - Put tractor in park position or set brake, disengage PTO, stop engine, remove key, and wait until noise of rotation has ceased to prevent entanglement in rotating parts which may cause injury or death.
  - Never mount or dismount a moving vehicle. Crushing from run over may cause injury or death.

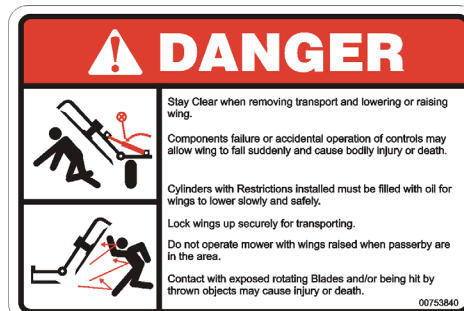




# SAFETY

**DANGER!** Stay clear when lowering or raising wings.

P/N 00753840



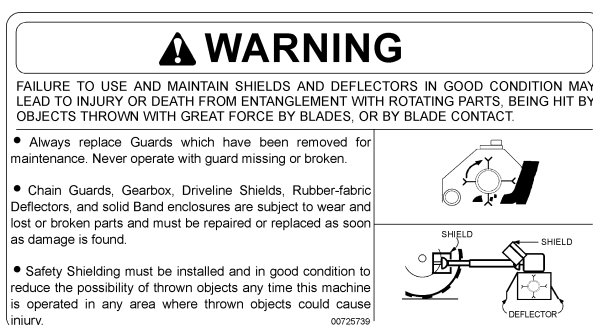
**DANGER!** Keep Away! If front deflector shield is removed from flail housing, serious injury to or amputation of hands, feet, or limbs may occur from blades contact. Always make sure that all shields are in place at all times.

P/N 002425



**WARNING!** Failure to use and maintain shields and deflectors in good condition may lead to injury or death from entanglement with rotating parts, being hit by objects thrown with great force by blades, or by blade contact.

P/N 00725739



Peligro Translation, If you do not know how to read English, please find someone who knows how to read English.

P/N 00725746

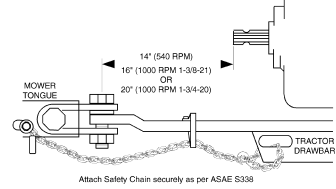


SAFETY

# SAFETY

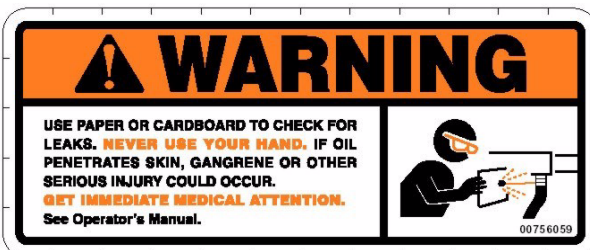
IMPORTANT! Required For Jackshaft Unit.  
Suggested for standard shaft.

**IMPORTANT**  
REQUIRED FOR JACKSHAFT UNIT  
SUGGESTED FOR STANDARD SHAFT



P/N D102

WARNING! Never use your hand to check for oil leaks. Always use paper or cardboard.



P/N 00756059

WARNING! Avoid Bodily Injury, Use 540RPM PTO Speed Only.



P/N D103

WARNING! Disengage PTO before folding wings to prevent instant failure of drivelines and possible severe bodily injury or death.



00763536

# SAFETY

**WARNING!** Do not operate with Belt Shield removed. Finger(s) may be pinched off if get caught between V-Belt and Pulley.

P/N 00758194



Operator's Manual (with repair parts) and warranty was attached to this implement during final inspection.

P/N 00763977

## NOTICE TO OWNER

An **OPERATOR'S MANUAL** (with Repair Parts Listing) and a **WARRANTY REGISTRATION CARD** were attached to this implement during final inspection at the factory. If they were not attached at the time of purchase, please contact your selling dealer at once.

1. Read and understand the Operator's Manual before operating the implement.
2. Complete, sign, and mail the Warranty Registration Card today.

00763977

For safety and to guarantee optimum product reliability always use genuine RHINO replacement parts.

P/N 00760657

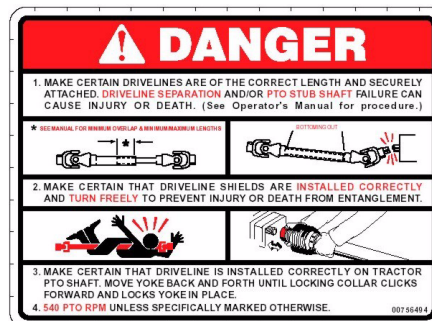
## IMPORTANT

For your safety and to guarantee optimum product reliability, always use Genuine RHINO replacement parts. The use of inferior "will-fit" parts will void Warranty of your RHINO implement and may cause premature or catastrophic failure which can result in serious injury or death. If you have any questions concerning the repair parts you are using, contact Rhino, 1020 S. Sangamon Ave., Gibson City, Illinois 60936 A Member of Alamo Group



**DANGER!** Make certain that drivelines are correct length and are securely attached.

P/N 00756494



SAFETY

# SAFETY

## SAFETY

PELIGRO! Spanish Translation for Driveline Safety

P/N 00773723

Logo Product Name: Rhino

P/N D302

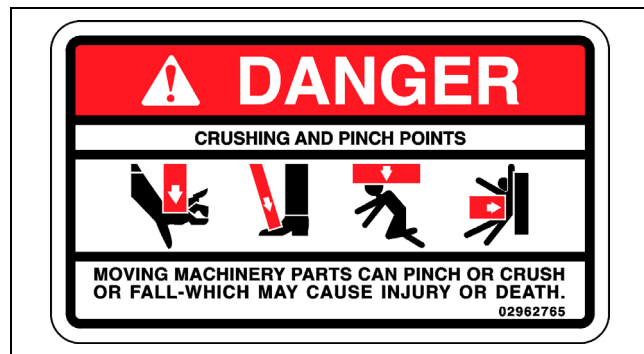
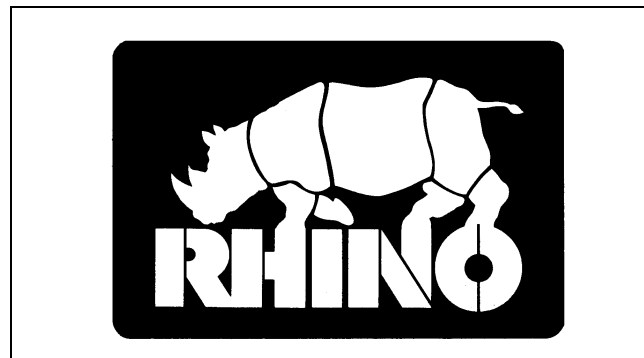
DANGER! Crushing and Pinch Points.

Moving machinery parts can pinch or crush or fall-which may cause injury or death.

P/N 02962765

FLEX FLAIL 21 NAME LOGO

P/N 00776748



# SAFETY

FLEX FLAIL 17 NAME LOGO



P/N 00776747

WARNING! - Guard Missing, Do Not Operate



P/N 00775933

Red Reflector. Keep reflectors clean and visible.



P/N 1458392

Information that Grease Fitting is present and must apply grease



P/N 000678

SAFETY

# SAFETY

## SAFETY

### INFORMATION - Use Genuine Rhino Flail Parts

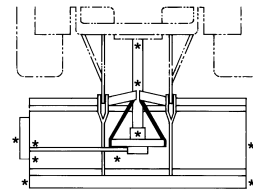
P/N 02964510



### INFORMATION - 8 Hour Lubrication Chart

P/N 001830

#### LUBRICATION CHART

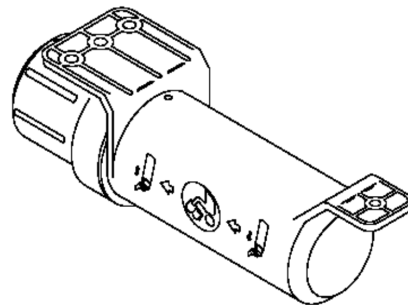


\* LUBRICATE ALL POINTS EVERY 8 HOURS OF OPERATION

001830

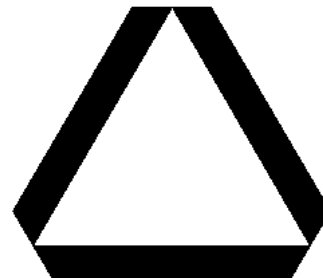
Read Operator's Manual! The operator's manual is located inside this canister. If the manual is missing order one from your dealer.

P/N 00776031



Slow Moving Vehicle Decal. Keep SMV reflector clean and visible. DO NOT transport or operate without the SMV.

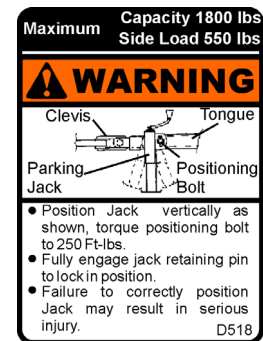
P/N 03200347



# SAFETY

WARNING! Jack - Maximum Capacity 1,800 lbs.  
Side Load 550 lbs.

P/N D518



SAFETY

# SAFETY

## SAFETY

### Federal Laws and Regulations

This section is intended to explain in broad terms the concept and effect of federal laws and regulations concerning employer and employee equipment operators. This section is not intended as a legal interpretation of the law and should not be considered as such.

#### Employer-Employee Operator Regulations

U.S. Public Law 91-596 (The Williams-Steiger Occupational and Health Act of 1970) OSHA

##### This Act Seeks:

"...to assure so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources..."

##### DUTIES

Sec. 5 (a) Each employer-

- (1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;
- (2) shall comply with occupational safety and health standards promulgated under this Act.
- (b) Each employee shall comply with occupational safety and health standards and all rules, regulations and orders issued pursuant to this Act which are applicable to his own actions and conduct.

#### OSHA Training Requirements

**Title 29, Code of Federal Regulations Part 1928.57(a)(6).** [www.osha.gov](http://www.osha.gov)

Operator instructions. At the time of initial assignment and at least annually thereafter, the employer shall instruct every employee who operates an agricultural tractor and implements in the safe operating practices and servicing of equipment with which they are or will be involved, and of any other practices dictated by the work environment.

Keep all guards in place when the machine is in operation;

Permit no riders on equipment

Stop engine, disconnect the power source, and wait for all machine movement to stop before servicing, adjusting, cleaning or unclogging the equipment, except where the machine must be running to be properly serviced or maintained, in which case the employer shall instruct employees as to all steps and procedures which are necessary to safely service or maintain the equipment.

Make sure everyone is clear of machinery before starting the engine, engaging power, or operating the machine.

#### Employer Responsibilities:

To ensure employee safety during Tractor and Implement operation, it is the employer's responsibility to:

1. Train the employee in the proper and safe operation of the Tractor and Implement.
2. Require that the employee read and fully understand the Tractor and Implement Operator's manual.
3. Permit only qualified and properly trained employees to operate the Tractor and Implement.
4. Maintain the Tractor and Implement in a safe operational condition and maintain all shields and guards on the equipment.
5. Ensure the Tractor is equipped with a functional ROPS and seat belt and require that the employee operator securely fasten the safety belt and operate with the ROPS in the raised position at all times.
6. Forbid the employee operator to carry additional riders on the Tractor or Implement.
7. Provide the required tools to maintain the Tractor and Implement in a good safe working condition and provide the necessary support devices to secure the equipment safely while performing repairs and service.
8. Require that the employee operator stop operation if bystanders or passersby come within 300 feet.

#### Child Labor Under 16 Years of Age

Some regulations specify that no one under the age of 16 may operate power machinery. It is your responsibility to know what these regulations are in your own area or situation. (Refer to U.S. Dept. of Labor, Employment Standard Administration, Wage & Home Division, Child Labor Bulletin #102.)



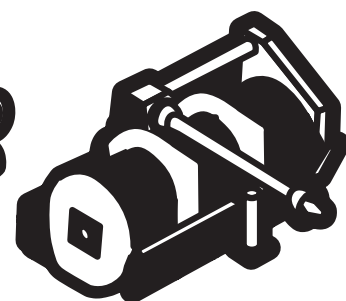
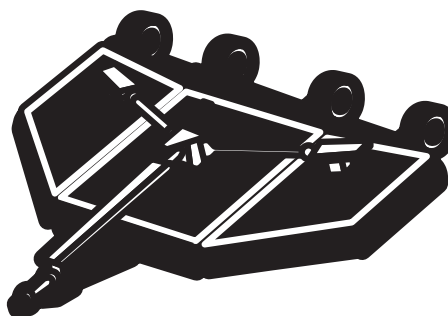
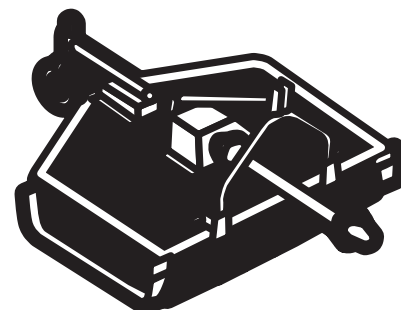
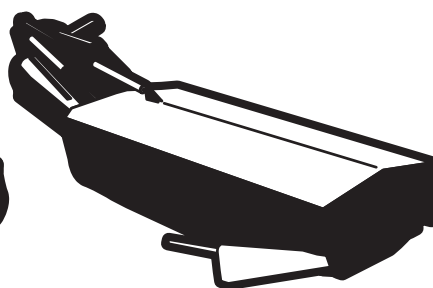
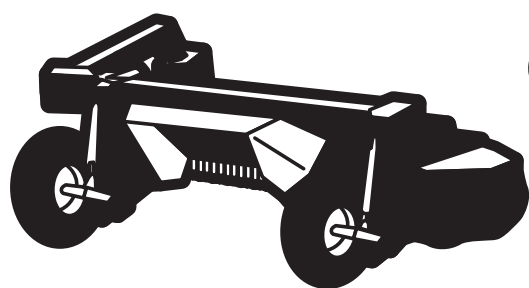
INDUSTRIAL/  
AGRICULTURAL MOWER

[www.aem.org](http://www.aem.org)



# **SAFETY MANUAL**

FOR OPERATING AND MAINTENANCE PERSONNEL



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## Acknowledgment

We wish to acknowledge the contributions of the members of AEM's Industrial/Agricultural Mower Manufacturers Council to the preparation of this Safety Manual.

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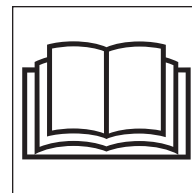
Copyright 2010© AEM (Association of Equipment Manufacturers)  
Revised 01/03, 09/10

## Foreword

This safety manual is intended to point out some of the basic safety situations that may be encountered during the normal operation and maintenance of your machine and to instruct you in safety practices for dealing with these conditions. This manual is **NOT** a substitute for the mower manufacturer's operator's manual(s).

Additional precautions may be necessary, or some instructions may not apply, depending on equipment, attachments and conditions at the worksite or in the service area. The manufacturer has no direct control over equipment application, operation, inspection or maintenance. Therefore, it is **YOUR** responsibility to use good safety practices in these areas.

The information provided in this manual supplements the specific information about your machine that is contained in the manufacturer's operator's manual(s). Other information that may affect the safe operation of your machine may be contained on safety signs or in insurance requirements, employer's safety and training programs, safety codes, local, state/provincial and federal laws, rules and regulations.



**Read and  
Understand  
Manuals Before  
Operating**



**IMPORTANT!** Before you operate the mower, make sure you have the manufacturer's operator's manual(s) for this machine and all attachments. If the manufacturer's manuals are missing, obtain replacement manuals from your employer, equipment dealer or directly from the manufacturer. Keep this safety manual and the manufacturer's manuals with the machine at all times. Read and understand all manuals.

The AEM Mower Safety Practices video is available to train and reinforce good safety practices. Operators are encouraged to periodically view the safety video.

# Safety Alerts

## Symbol

This Safety Alert Symbol means: **“ATTENTION! STAY ALERT! YOUR SAFETY IS INVOLVED!”**

The Safety Alert Symbol identifies important safety messages on equipment, safety signs, in manuals or elsewhere. When you see this symbol, be alert to the possibility of death or personal injury. Follow instructions in the safety message.



Reasons Safety is Important:

- Accidents disable and kill.
- Accidents cost.
- Accidents can be avoided.

## Signal Words

Signal words are distinctive words that will typically be found on safety signs on the mower and other worksite equipment. These words may also be found in this manual and the manufacturer's manuals. These words are intended to alert the operator to a hazard and the degree of severity of the hazard.



**DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury.



**WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury.



**CAUTION** indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



**NOTICE** indicates a property damage message.

## A Word To The User/Operator

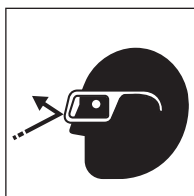
It is **YOUR** responsibility to read and understand the safety manual and the manufacturer's manuals before operating this machine. This safety manual takes you step by step through your working day.

**Hazard Recognition and Accident Prevention** depend upon you being alert, careful and properly trained in the operation, transport, maintenance and storage of this equipment.

Graphics have been provided to help you understand the text.

Remember that **YOU** are the key to safety. Good safety practices not only protect you but also protect the people around you. Study and understand this manual and the manufacturer's manuals for your specific machine. Make them a working part of your safety program. Keep in mind that this safety manual is written for industrial/agricultural mowers.

Contact the manufacturer of your equipment to answer any questions about safe operation that remain after studying the manufacturer's operator's manual(s) and this safety manual.



**Practice all other usual and customary safe working precautions and above all:**

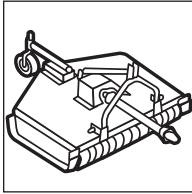
**REMEMBER — SAFETY IS UP TO YOU!**

**YOU CAN PREVENT SERIOUS INJURY OR DEATH CAUSED BY UNSAFE WORK PRACTICES!**

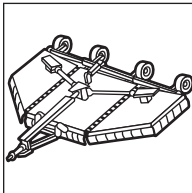
# The Industrial/Agricultural Mower

## Industrial/Agricultural Mower Types

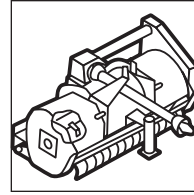
Mowers are used for pasture clipping, crop residue shredding, heavy brush cutting, waterways, right-of-ways, roadside or highway mowing. Also, these mowers are used for cutting grass and other growth in public areas such as parks and cemeteries.



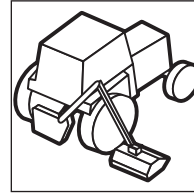
**Rotary**



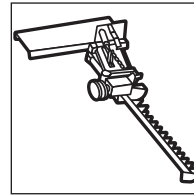
**Folding Wing Rotary**



**Flail**



**Boom**



**Sickle Bar**

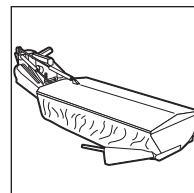
# The Industrial/Agricultural Mower

## Agricultural Disc Mower Types

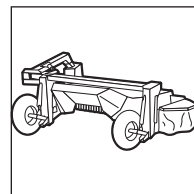
Disc mowers are designed and equipped to cut hay crops at higher field speed.

Disc mower/conditioners mow and condition crops.

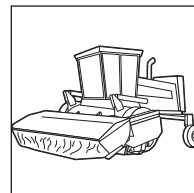
Self-propelled windrowers mow and form conditioned hay into windrows.



**Disc Mower**



**Disc Mower  
Conditioner**



**Self-propelled  
Windrower**

# Follow A Safety Program

## Protect Yourself

Wear personal protective clothing and Personal Protective Equipment (PPE) issued to you or called for by job conditions. You must **ALWAYS** wear safety glasses with side shields.

You may also need:

- Hard hat
- Safety shoes
- Safety goggles or face shield
- Heavy gloves
- Hearing protection
- Reflective clothing
- Wet weather gear
- Respirator or filter mask

Wear whatever is needed—don't take chances.

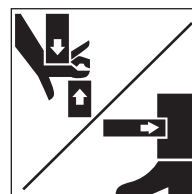
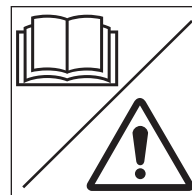
**WARNING!** Prevent death or serious injury from entanglement. **Do not wear loose clothing or accessories. Tie up long hair. Stay away from all rotating components when the engine is running.** Contact, wrapping or entanglement with rotating or moving parts could result in death or serious injury.



# Follow A Safety Program

- Read, understand and follow the manufacturer's written instructions found in the operator's manual(s) and safety signs on mower and tractor.
- Have operational training with mower and tractor.
- Take advantage of training programs offered in your area.
- Ask your equipment dealer or supervisor to explain things you do not understand.
- Explain the written instructions in the operator's manual(s) and safety signs to those users or operators who cannot read.
- Inspect the mower and tractor daily before operating. Ensure all guards are in place and the equipment is operating properly.
- Never smoke while operating. Never fill the fuel tank with the engine running or near an open flame.
- Make sure you have adequate visibility and sufficient lighting.
- Know the pinch points and rotating parts. Awareness on your part can prevent accidents.
- Never attempt to operate the controls except from the operator's seat. Improperly controlled functions could produce unexpected machine movement and result in serious injury or death.

- Shut down the mower and tractor before dismounting. (See page 18, **Proper Equipment Shut Down Practices.**)



# Follow A Safety Program

## Avoid Injury From Raised Equipment

Avoid possible crushing injury from falling mower or other raised equipment.



**Avoid Crushing –  
Block Up or  
Securely Support  
Mower**

Before working near or under raised mower or equipment parts:

- Securely support or block up raised mower or equipment parts according to the operator's manual.
- Securely support, block up or lock up wings with approved locking devices or lower mower or equipment parts to the ground.
- Use transport locks when transporting mower on public roads.

## Avoid Injury From High Pressure Fluid

Avoid fluid injection injury due to high pressure fluid leaks.



**High Pressure  
Fluid Can Inject  
into the Body**

**If any fluid is injected into the skin, it must be removed within a few hours by a doctor familiar with this type of injury.**

Fluid leaks under pressure may not be visible. When checking for leaks or working around pressurized systems:

- Read manufacturer's operator's manual(s) for recommended safety practices.
- Wear a face shield or safety goggles for eye protection.
- Use a piece of cardboard or wood to check for leaks;  
**DO NOT use your hands.**
- Relieve system pressure before disconnecting lines.
- Check for and repair damaged or leaking lines, pipes and hoses.
- Check for and tighten loose connections.
- Purge air from system before operating.

# Follow A Safety Program

## Avoid Injury From Fire And Explosion

Set the parking brake, shut the mower and tractor engine down and remove the key while filling the fuel tank. Use extra caution when fueling a hot engine. Never smoke while fueling. Avoid sparks by grounding the fuel nozzle against the filler neck.

The fumes in an empty fuel tank are explosive. Never weld or cut on fuel lines, tanks or containers.

Remove all trash or mowing debris from the machine daily or as needed. Keep debris away from engine, exhaust, slip clutches and other heat sources. Use spark arrestors, as appropriate, on the engine exhaust system. Make sure oily rags or other flammable material are not stored on the machine.

Check for fuel, oil or hydraulic fluid leaks. Repair the leaks and clean the machine before you operate it.

Ether/cold start fluid is flammable. Do not smoke when using ether/cold start fluid. Always follow the instructions on the can and in the manufacturer's operator's manual(s) for your mower. Do not use ether/cold start fluid if the engine is equipped with a glow plug or other type of preheater.

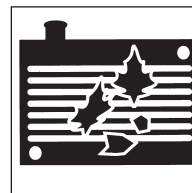
Always use a nonflammable solvent when you clean parts. Do not use gasoline, diesel fuel or other flammable fluids.

Store all flammable fluids and materials away from your machine and work area.

Know where fire extinguishers are kept—how they operate—and what type of fire they are for. Check readiness of fire extinguishers according to manufacturer's instructions. Make sure each tractor is equipped with a fire extinguisher.



**No Smoking  
and No Open  
Flames**



**Remove  
Debris Daily or  
As Needed**

# Follow A Safety Program

## Be Alert!

Know where to get assistance. Know how to use a first aid kit and fire extinguisher/fire suppression system.

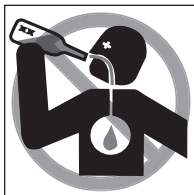
## Be Aware!

Take advantage of training programs offered.

## Be Careful!

Human error is caused by many factors: carelessness, fatigue, overload, preoccupation, unfamiliarity of operator with the machine, drugs, and alcohol to name a few. Damage to the tractor or mower can be fixed in a short period of time, but injury, or death, has a lasting effect.

For your safety and the safety of others, encourage your fellow workers to act safely.



**Never Use Drugs  
or Alcohol While  
Operating**

## For Safe Operation

You must be a qualified and authorized operator for proper operation of your machine. You must clearly understand the written instructions supplied by the manufacturer, be trained—including actual operation of the mower—and know the safety rules and regulations for the worksite. It is a good safety practice to point out and explain safety signs and practices and ensure others understand the importance of following these instructions.

**WARNING!** Drugs and alcohol affect an operator's alertness and coordination and the operator's ability to safely operate the equipment. **Never use drugs or alcohol while operating the mowing equipment. Never knowingly allow anyone to operate this machine when their alertness or coordination is impaired.** An operator taking prescription or over-the-counter medication must consult a medical professional regarding any side effects of the medication that would hinder their ability to safely operate this equipment.

# Follow A Safety Program

## Know The Rules

Most employers have rules governing operation and maintenance of equipment. Before you start work at a new location, check with your supervisor or the safety coordinator. Ask about the rules you will be expected to obey.

The Occupational Safety and Health Administration (OSHA) enforces federal laws within the United States that apply to safe operation, application and maintenance of equipment on a worksite. It is the employer's responsibility to comply with these laws. An OSHA representative may periodically inspect a worksite to see that these laws are being followed.

There may also be local or state/provincial laws or international regulations that apply to this equipment and its use, along with specific worksite or employer rules. It is important that you know and comply with all applicable laws and rules, including those requiring operator training and certification.

### **Safety Rules**

- |         |         |
|---------|---------|
| • _____ | • _____ |
| • _____ | • _____ |
| • _____ | • _____ |
| • _____ | • _____ |
| • _____ | • _____ |

**Know and  
Understand  
Rules of  
Operation**

### **These are some of the rules you must work by:**

- A ROPS and seat belt-equipped tractor is a federal government (OSHA) requirement for operator protection during mowing operations. An enclosed cab provides additional operator protection from thrown objects. Check your mower operator's manual to see if a tractor cab is also required.
- Wear and check that others are wearing proper clothing and personal protective equipment.
- Inspect your machine and attachments before each use as specified by the manufacturer and your employer.
- Know the limitations and operating characteristics of your mowing equipment. Do not misuse it.
- Have all provided shields and guards properly installed before operating the machine.
- Never modify or remove any part of the machine (except for service—then make sure it is replaced).



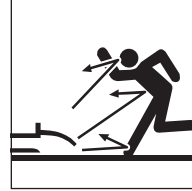
# Follow A Safety Program

## Some Rules You Must Work By (continued)

- Only qualified and authorized individuals may operate this equipment.
- **Never allow children to play on, ride on or operate** the equipment. Children **are not** qualified to operate this equipment.
- **Do not allow any** riders.
- Use three-point contact (handholds and steps) and face the equipment when mounting or dismounting.
- Keep bystanders 300 ft (92 m) from the mowing operation.
- Know the worksite before you use the mower. Be aware of possible terrain hazards that you may encounter. Remove or mark obstacles and debris that could damage or be thrown by the mower.
- Only use attachments and parts that are approved by the mower manufacturer.
- Make sure all attachments are lowered, set the parking brake, shut off the engine and cycle the control levers. Remove the key before leaving the tractor. (See page 18, **Proper Equipment Shut Down Practices.**)
- When transporting the mower on a trailer, follow the manufacturer's detailed instructions for loading, tying down and unloading the mower.



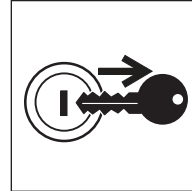
Keep  
Children  
Away from  
Equipment



Keep  
Bystanders  
Away



No Riders



Shut Down  
Unattended  
Equipment

# Follow A Safety Program

## Know The Equipment

Read and understand the DANGER, WARNING, CAUTION and NOTICE safety signs and other informational signs on the tractor and mower and in the manufacturer's operator's manual. Ask your supervisor or mower dealer to explain any information you do not understand. Failure to obey safety instructions could result in death or serious injury.

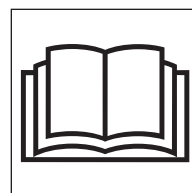


Read and  
Understand All  
Safety Signs

Make sure all the manufacturer's protective structures, guards, shields, screens and panels are in good repair, in place and securely fastened. Damaged, missing or weakened safety components can create a hazardous situation for you as the operator. **Never** remove or modify any safety components including thrown object shielding on a mower.

## Know the following about your tractor and mower:

- Function, purpose and use of all controls.
- Correct operation speeds.
- Slope and uneven terrain capabilities and proper operation.
- Braking and steering characteristics.
- Turning radius and clearances.
- How to quickly stop equipment in an emergency.



Read and  
Understand  
Manuals Before  
Operating



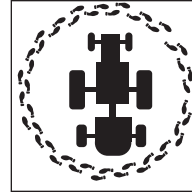
# Prepare For Safe Operation

## Check The Mower And Tractor Equipment

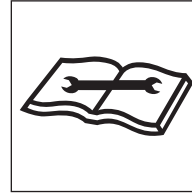
Before beginning your work day inspect the machine and have all systems in good operational condition.

**WARNING!** Prevent possible crushing injury from falling equipment. Hydraulic system or part failure could cause unsupported equipment to fall. **Do not go under raised equipment unless it is properly supported according to the operator's manual.**

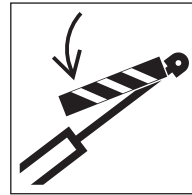
- Perform daily and periodic service procedures as instructed by the equipment manufacturer.
- Check for loose, broken, missing or damaged tractor and mower parts. Repair or replace these parts.
- Check for proper tractor and mower attachments.
- Check for proper tractor and mower PTO rpm rating match.
- Check mower blade(s) condition. Replace severely worn, bent, gouged or nicked blades including the blade bolts and fasteners. Never straighten or weld on blades.
- Ensure thrown object shielding is properly installed and in good condition. Repair or replace if damaged or missing.



Walk-Around  
Inspection



Maintain  
Machine



Read Manual –  
Block Up or  
Securely Support  
Mower

# Prepare For Safe Operation

- Check that all guards and shields are in place and that all equipment is in good operating condition. This includes PTO driveline, gearbox and implement guards and shields that are used for operator protection.
- Check for properly latched driveline yoke-end locking devices.
- Check for damaged or leaky tractor and mower hydraulic systems. Repair or adjust as needed.

**WARNING!** Hydraulic fluid under pressure can penetrate the skin or eyes and cause serious injury, blindness or death. Fluid leaks under pressure may not be visible.

**Use a piece of cardboard or wood to find leaks, not your hand. Wear eye protection.** If fluid is injected into the skin, it must be removed within a few hours by medical personnel familiar with this type of injury.

- Keep the operator platform surface clean and free of grease, oil, dirt, snow or ice. Steps and handholds must be clean and functional.
- Ensure work lights are kept clean (if equipped). Check that all lights work properly.
- Ensure the slow moving vehicle (SMV) sign, reflectors and warning lights are in good condition and can be clearly seen.

- Ensure all tools or loose objects are removed or securely fastened while operating the machine.
- Check all safety signs for clarity. Replace damaged signs.



Check for Missing/  
Damaged Guards  
and Shields



Check for  
Leaks and Inspect  
Hoses

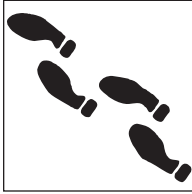


Put Away  
Tools

# Prepare For Safe Operation

## Know The Work Area

Before you operate the mower thoroughly inspect the work area. Walk around the area and inspect the surfaces you will travel on when using the mower.



**Walk  
Around the  
Worksite**

Locate and avoid:

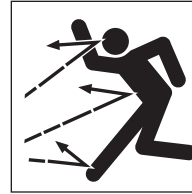
- |                      |               |                   |
|----------------------|---------------|-------------------|
| — Holes              | — Deep mud    | — Other utilities |
| — Drop-offs          | — Wet spots   | — Any conditions  |
| — Obstacles (stumps) | — Soft soil   | which could       |
| — Excavations        | — Rough spots | cause collision,  |
| — Standing water     | — Power lines | loss of control   |
|                      | and apparatus | or tipover        |
|                      |               | — Steep slopes    |

Look for debris and obstacles by walking the area before you mow. Objects like wire, cable, rocks, tires, and metal objects that could damage or be thrown by the mower must be removed or marked clearly and avoided.

Correct unsafe conditions. Do not operate in problem areas where debris and obstacles cannot be removed or marked.

Analyze mowing area to determine:

- The most efficient mowing procedure.
- The height of the material to be mowed.
- Operating terrain conditions.
- How to best use forward mowing pattern.
- The potential for bystanders or passers-by to be exposed to thrown objects.



**Remove or  
Mark Debris and  
Obstacles**

## Look Out For Others

Before starting equipment:

- Walk around the equipment.
- Check for anyone under, on or near the equipment.
- Clear everyone from these areas.
- Sound a warning.

# Prepare For Safe Operation

## Mount And Dismount Tractor Properly

Always use three-point contact when mounting or dismounting the tractor or mower. Face the machine when you enter or leave the machine. Three-point contact means that three out of four arms and legs are in contact with the machine at all times during mount and dismount.

Before mounting:

- Clean shoes and wipe hands. Clean steps and handholds of snow, ice, mud or oil.

During mounting and dismounting:

- Use handholds and step plates.
- Never grab steering wheels or controls for handholds.
- Never mount or dismount from a moving tractor.
- Never mount or dismount while carrying tools or objects that prevent three-point contact. Put parts or tools down. Maintaining proper contact, climb and then pick up the object.



**Use  
Three-Point  
Contact**



**Clean Up  
Slippery Areas**

# Prepare For Safe Operation

## Tractor And Mower Controls Safety Test

Start the tractor following the specific procedures in the manufacturer's operator's manual. These procedures normally include:

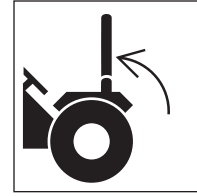
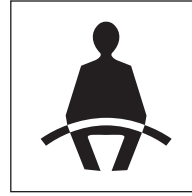
- Fasten and adjust seat belt on your ROPS-equipped tractor.
- Check parking brake for engagement.
- Check PTO disengagement.
- Check all controls for Park position.
- Warn others in area before starting tractor.
- Start tractor following tractor manufacturer's recommended starting procedures.

**WARNING!** Avoid serious injury or death from unexpected machine movement. **Start the engine only from the operator's position. Never attempt to start the engine by shorting across starter terminals or reaching the key from the ground or outside the cab.**

After starting:

- Check all instruments, gauges and indicator lights for normal operation.
- Check all tractor controls, steering and brakes for proper function.

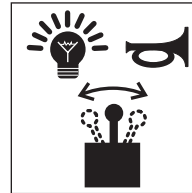
- Raise and lower mower to check for driveline bottoming out or engagement problems.
- Check the equipment for excessive vibration and unusual noises.



Use ROPS  
and Seat Belt



Start Only  
from Operator's  
Seat



Check  
Instruments  
and Controls

# Prepare For Safe Operation

- Use proper equipment shut down practices before inspecting equipment. Wait until all equipment motion has stopped before dismounting the tractor or mower.
- Do not operate mower unless tractor and mower are running properly. Place a "Do Not Operate" tag on the machine, remove the key and do not operate the mower until the problem is corrected.

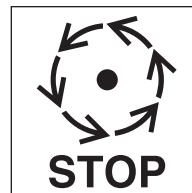
## Power Takeoff System

Be sure to operate the tractor at the mower's rated PTO rpm speed.

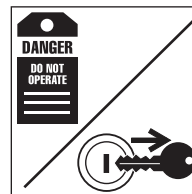
When operating tractors with transmission-driven PTO systems, a rotary mower will have a significant flywheel effect. The mower may continue to propel a tractor with a transmission-driven PTO system.

The tractor should be equipped and operated as follows:

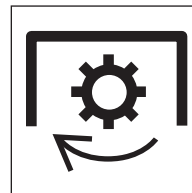
- Install a driveline equipped with an over-running clutch.
- Give yourself sufficient maneuvering room and time by anticipating turns, stops and speed reductions.



Do Not  
Dismount Until  
Equipment Motion  
Has Stopped



Use a  
"Do Not Operate"  
Tag



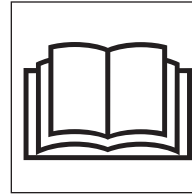
Use Proper  
PTO Speed

# Prepare For Safe Operation

## Hitching Mower To Tractor

### Three-point hitch-mounted mowers:

- Refer to mower and tractor manufacturers' manuals.
- Place tractor's hydraulic power lift (rockshaft) selector lever in down position to avoid unexpected movement.
- Explain the hitching procedures to those operators who cannot read.
- Front-end weights may be needed to maintain steering control and front-end stability. Refer to the manufacturers' operator's manual(s).
- When backing the tractor up to the mower, NEVER allow anyone between the tractor and the mower.
- Attach the mower to the tractor three-point links and securely pin in position.
- Securely attach the driveline to the tractor PTO. Lower the master shield into place if it is movable. Push and pull on the driveline to ensure it is locked onto the PTO shaft.



**Read and Understand Manuals Before Operating**



**Maintain Proper Weight Distribution**



**No One Allowed Between Tractor and Mower**

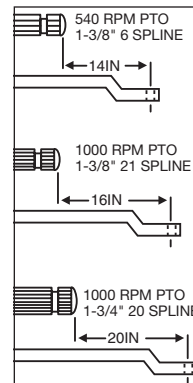


**Avoid Entanglement, Use Guards and Shields**

# Prepare For Safe Operation

### Pull-type hitch-mounted mowers:

- Refer to mower and tractor manufacturers' manuals.
- Remove three-point hitch quick coupler if equipped.
- Attach only to drawbar hitch.
- Adjust tractor drawbar length for 540 or 1000 rpm PTO operation.
- When backing the tractor up to the mower, NEVER allow anyone between the tractor and the mower.
- Properly attach the mower safety tow chain to the tractor.
- Securely attach the driveline to the tractor PTO. Push and pull on the driveline to ensure it is locked onto the PTO. Lower the master shield into place.
- Hook up the mower hydraulic hoses to the tractor.
- Make sure the wings, or raised mower decks, are supported by the cylinders before removing the transport locks. Never use force to release the transport or wing locks. The wings or deck could fall and crush you.



**Tractor Drawbar Adjustment**



**Confirm Wings Are Supported Before Releasing Locks**



**Avoid Entanglement, Use Guards and Shields**

# Start Safely

## Make The Right Start

Mow only in daylight or good artificial light conditions.

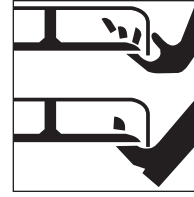
Avoid serious injury or death from mower-thrown objects or blade contact:

- Keep chain shields, flexible or solid deflector shields or discharge chutes in place and in good repair.
- Keep bystanders at least 300 ft (92 m) from mowing operation.
- Never direct mower discharge toward anyone.
- Keep hands, feet and other body parts away from rotating parts, blades and discharge openings.
- Do not operate mower in transport position.

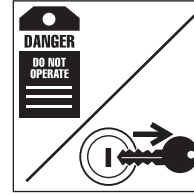
Do not approach a mower until all motion has stopped.

Mower PTO drive engagement:

- Raise mower to maximum cutting height.
- Engage PTO at low engine rpm.
- Increase engine rpm to mower's rated rpm PTO speed.
- Lower mower to desired cutting height.
- Stop and shut down immediately if the mower strikes an obstruction.
- Inspect and repair any mower damage before resuming mowing.
- Do not operate mower with severe vibrations or with unusual noise.



**Rotating Blades –  
Keep Away**



**Do Not Operate a  
Damaged Mower**

## Mower-Thrown Objects

Depending on the designed purpose, mowers are designed to cut grass, weeds, brush and crops. The mower blades have been designed and tested for rugged use. The mower blades, however, are not intended to contact solid objects like rocks, concrete or metal. Such impact can cause broken objects to be thrown up to 300 ft (92 m). Bystanders should never be within 300 ft (92 m) of an operating rotary mower or within 100 ft (30 M) of a properly equipped disc mower.

# Operate Safely

Mower shielding is designed to reduce the risk of thrown objects and must be properly maintained and in place during mowing operations.

The risk of serious injury or death from thrown objects can be significantly reduced by following three rules.

**If all of these safety rules are not followed, the mowing operation must be stopped if anyone comes within the safety limit for the mower type.**

**First** — Inspect the area prior to mowing and remove stones, branches, wire, cable, metal, glass and other solid objects before operating. Any objects that cannot be removed must be clearly marked and carefully avoided by the operator.

In non-crop areas with grass and weeds high enough to hide objects that could be struck by the blades, inspect the area and remove or mark large debris or obstacles.

Mow the area at an intermediate height. Inspect the area closely and remove or mark any remaining debris or obstacles. Mow again at desired final height.



**Follow  
All Mower  
Safety Rules**

**Second** — Mower-thrown object shielding must be used when operating near roads, parks, populated areas or other areas where thrown objects could injure bystanders or damage property. Follow the manufacturer's operator's manual.

**Third** — Cross diagonally when mowing through ditches, sharp dips, and drops. Raise the mower to prevent the mower blades from hitting the ground.

# Operate Safely

## Mower-Thrown Objects (continued)

**Disc Mowers** — When using a disc mower it is important to know the area to be mowed. If the operator has mowed the field before and is familiar with all obstacles that may be present, it is sufficient to watch ahead of the mower path for any additional objects that may have entered the field. Be ready to stop or avoid any objects that could be hazardous if thrown by the mower. If you plan to mow an unfamiliar field and it is next to a traveled road or people may be within 100 ft (30 m) of the mower you must inspect, and clean or mark the field.

## Mowing In Reverse

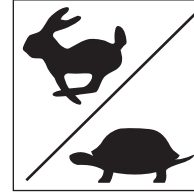
Do not mow while traveling in reverse. Objects are more likely to be thrown and can travel further.

Shut off the PTO, wait for the blades to stop turning, raise the mower, and then back up.

Mow traveling in the forward direction.



**Do Not Mow  
in Reverse**



**Use Proper  
Ground Speed**

## Mowing Ground Speed

Proper ground speed depends on terrain conditions and grass type, density and height to be cut:

- Normal ground speed range is 2 to 5 mph.
- Use slower ground speed for mowing tall, dense grass.
- Use faster ground speed for mowing medium height, thin grass and under smooth terrain conditions.
- Use slower ground speed for mowing in rough, sloping or unfamiliar terrain.

Disc mowers are designed to use faster ground speeds for operating in fields clear of debris and surface hazards.

# Operate Safely

## Extremely Tall Grass Mowing

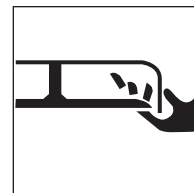
You may need to mow extremely tall, non-crop grass twice. (See page 13, **Mower-Thrown Objects**.)

First mowing pass:

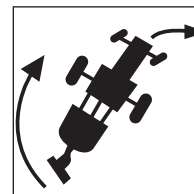
- Shut the mower and tractor down using proper equipment shut down practice before dismounting tractor. (See page 18, **Proper Equipment Shut Down Practices**.)
- Inspect the area and remove or mark debris and obstacles.
- Cut grass higher (10-15 inches) to avoid hidden objects.

Second mowing pass:

- Shut the mower and tractor down using proper equipment shut down practice before dismounting tractor.
- Inspect the area and remove or mark debris and obstacles.
- Cut grass at desired height and, when possible, 90 degrees to the first mowing pass.



**Stop Blade  
Before  
Unclogging**



**Provide Adequate  
Clearance for  
Mower Swing**

## Watch Equipment Clearances

Three-point hitch and side-mounted mowers have a larger turning arc than pull-type mowers. Allow sufficient clearance for mower swing while turning.

Do not allow bystanders near the tractor and mower when moving or transporting the tractor and mower.

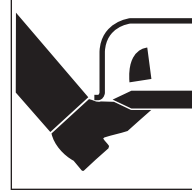


# Operate Safely

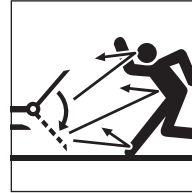
## Under Mount Mower Safety Practices

When mowing with an under mount mower:

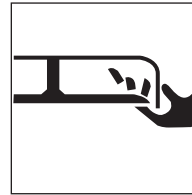
- Keep removable discharge chute in place and over discharge opening.
- Never stand on a mower housing when the tractor engine is operating.
- Distribute grass clippings with discharge chute facing mowed area.
- Before clearing a clogged mower or discharge chute, shut down your machine using proper equipment shut down practice. (See page 18, **Proper Equipment Shut Down Practices.**)



Never Stand  
on Mower –  
Keep Away



Keep Chute  
in Place



Stop Blade  
Before  
Unclogging

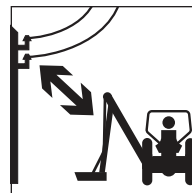
# Operate Safely

## Wing Or Boom Mower

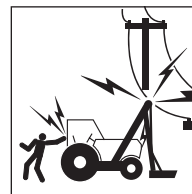
### Overhead Obstruction Hazards And Risks

Check for overhead obstructions with raised wing or boom mowers to avoid serious injury or death by contact with:

- Electrical power lines and apparatus.
- Low tree limbs.
- Other overhead obstructions.
- Maintain specified distance from power lines and apparatus. Never approach energized power lines or apparatus with any part of your machine unless all local, state/provincial and federal (OSHA) required safety precautions have been taken. Use extreme caution.



Do Not  
Approach Energized  
Power Lines



Stay Clear  
of Energized  
Equipment

**DANGER!** Avoid electrocution or serious injury from contact with or inadequate clearance to energized power lines or apparatus. **Do not allow the machine or attachment to approach or contact any power line. Do not approach or touch any machine in contact with a power line.**

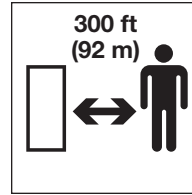
# Operate Safely

## Wing And Side Mount Mowers Safety Practices

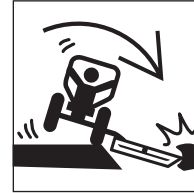
Raised wing positions reduce shielding protection and increases the thrown object and blade contact hazard risks.

**Avoid possible serious injury or death by thrown objects or blade contact from raising and lowering wings during mowing operations:**

- Do not mow with bystanders within 300 ft (92 m) of the mower.
- Be sure no one is near mower while raising or lowering wings.
- Shut off the PTO and wait for all rotating elements to stop before raising the mower deck or wing section.
- Only raise wing to clear objects in the mowing path or to match ground slope.
- Lower raised wing to ground after clearing object or ground slope conditions.
- Stop mowing if anyone approaches within 300 ft (92 m) of mowing area.



**Keep Bystanders  
Away from  
Mowing Area**



**Avoid Hitting  
Obstructions**

## Ditch Bank Mowing Safety Practices

Use extreme care when mowing ditch banks. Watch for washouts, eroded areas and mowing obstructions along the ditch banks. Hitting obstructions with side-mount or boom mowers may swerve the tractor's front end toward the ditch.

# Operate Safely

Raised wing and boom mower ditch bank operations may reduce the mower's thrown object shielding effectiveness for the mower operator's protection.

- Use enclosed ROPS cabs, special protective enclosures and other operator shielding available from the manufacturer when performing these operations.
- Inspect mowing area and remove or mark all foreign objects and debris to be avoided by mower.

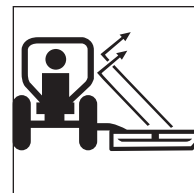
## Uneven Terrain Mowing Safety Practices

Tractor and mower stability is reduced on slopes and uneven terrain.

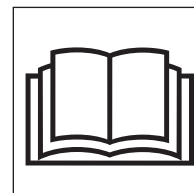
As in all conditions when mowing, use tractors equipped with ROPS and seat belt. **Make sure the ROPS are raised and locked in place and always wear your seat belt.**

Prevent tractor and mower overturns and maintain equipment stability control:

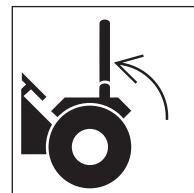
- Review tractor and mower operator's manuals for operating safety practices on slopes and uneven terrain conditions. Explain the practices to those users and operators who cannot read.
- Avoid extremely steep slope operations.



**Use  
Enclosed ROPS  
Cabs or Protective  
Enclosures**



**Read and  
Understand  
Manuals Before  
Operating**



**Use ROPS  
and Seat Belt**

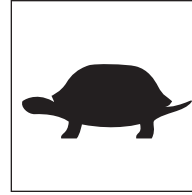


# Operate Safely

## Uneven Terrain Mowing Safety Practices (continued)

- Use extreme care to maintain control over the equipment when operating in these conditions.
- Increase tractor stability by adding wheel weights, ballast and increasing wheel spacing to maximum. Refer to operator's manual for recommendations.
- Maintain minimum ground speed.
- Make wide and gradual turns.
- Avoid sudden starts, stops, and turns when operating up, down, or across slopes.
- **Do not** raise rear-mount or side-mount mowers or mower wings from the ground during these operations.
- Keep alert for holes, bumps, ruts, rocks, stumps or other obstructions that could overturn the machine.
- Avoid slippery ground conditions that could cause loss of control and overturn of tractor and mower.
- Avoid bottoming and striking the ground by diagonal crossing of sharp dips and drops.

Use extreme care in maintaining equipment stability during all uneven terrain and slope mowing operations. You are the final judge as to any slope that can be safely negotiated.



**Maintain Control, Use Low Speeds**



**Add Ballast, Widen Wheel Spacing**



**Avoid Ruts, Bumps, Holes**

# Operate Safely

## Road Transport Safety Practices

Before operating on public roads:

- Refer to tractor and mower manufacturers' operator's manuals for instructions.
- Explain the instructions to those users or operators who cannot read.
- Check local regulations for required equipment markings, lights, flashers, etc., while traveling on public roads. Lights are required on mowers that obscure tractor taillights and/or warning lights.
- When transporting the mower on a trailer, follow the manufacturer's detailed instructions for loading, tying down and unloading the mower.

Before transporting on public roads:

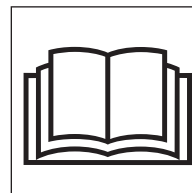
- Disengage PTO power to mower.
- Raise mower into transport position and engage transport lock.
- Lock mower wings in the transport position with approved locking devices.
- Attach towing safety chain between pull-type mower and tractor.
- Make sure lights, warning lights and reflectors are in place and visible.

- Check SMV (Slow-Moving Vehicle) emblem for visibility to any rear-approaching vehicle.

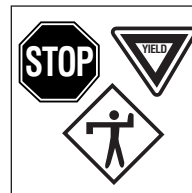
While transporting on public roads:

- Obey all local traffic regulations.
- Approach intersections with caution.
- Observe speed and traffic control signs.
- Avoid panic stops and sharp turns.

Be a courteous operator and pull over periodically and allow traffic to pass.



**Read and Understand Manuals Before Operating**



**Obey Traffic Regulations**

# Park Safely

## Parking Safety Practices

- Use designated or out-of-traffic areas.
- Use firm level ground locations.
- Set parking brake.
- Lower raised equipment to ground.

Shut down the mower and tractor using proper equipment shut down practice before dismounting tractor. (See page 18, **Proper Equipment Shut Down Practices.**)

Sloping ground parking locations:

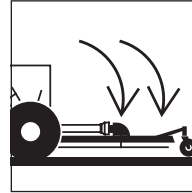
- Position equipment across slope.
- Set parking brakes.
- Lower raised equipment to ground.
- Block tractor wheels.

Before temporarily parking and leaving disabled equipment near traffic areas:

- Remove equipment from public roads.
- Set out warning flags.
- Use tractor flashing warning lights.



Set  
Parking Brake



Lower Raised  
Equipment to  
Ground

# Shut Down Safely

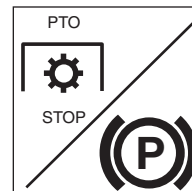
## Proper Equipment Shut Down Practices

Make proper equipment shut down an important habit.

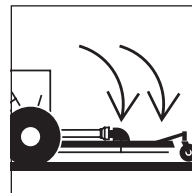
Properly shutting down a tractor and mower can prevent accidents from occurring when the mower is left unattended. Shut down the mower following the specific procedures in the manufacturer's operator's manual.

These procedures will normally include:

- Reduce engine speed.
- Disengage PTO clutch and transmission drive.
- Idle engine for gradual cooling.
- Place all controls in PARK position.
- Set the parking brake.
- Lower mower to ground.
- Lower wings of wing mowers to ground.
- Shut off engine, lock ignition and remove key from the machine and take it with you.
- Wait for all moving parts to stop before dismounting.
- Relieve hydraulic pressure by moving hydraulic controls several times in all directions.
- Lock anti-vandalism covers and closures, if equipped, when equipment is unattended.
- Dismount carefully maintaining three-point contact.



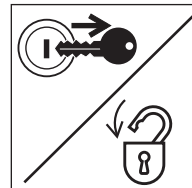
Disengage PTO,  
Set Brake



Lower Raised  
Equipment to  
Ground



Wait for  
Rotating Parts  
to Stop



Remove Key,  
Lock Ignition, Take  
Key With You

# Shut Down Safely

## Dismounting Properly

- Never dismount from moving equipment.
- Never jump from any machines.
- Dismount carefully.
- Check for slippery steps.
- Keep feet and hands away from controls.
- Use handholds and steps during dismount.
- Face machine and use three-point contact (2 hands and 1 foot or 2 feet and 1 hand).



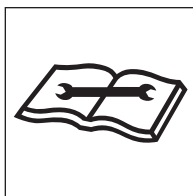
Wait for  
Moving Parts  
to Stop



Use Three-Point  
Contact,  
Face Machine

# Perform Maintenance Safely

## Maintain Your Equipment



Maintain  
Equipment

Be sure to maintain the equipment according to manufacturer's instructions. Regularly check the operation of the protective and safety devices.

**Do not** perform any work on a tractor or mower unless you are authorized and qualified to do so.

If you have been authorized to do maintenance, **read the operator's and service manuals**. Study the instructions; check the lubrication charts; examine all the instruction messages on the machine. Maintenance can be hazardous unless performed properly. Be sure you have the necessary skill, information, correct tools and equipment to do the job.

**WARNING! Do not modify equipment or add components not approved by the manufacturer.** Use parts, lubricants and service techniques recommended by the manufacturer.

## Mower Parts And Your Safety

Mower manufacturers use specific fasteners and specially designed parts to meet mowing operations requirements. Critical parts (self-locking blade bolts, blades, pins, shields and other special items) have specific strength, design and fit requirements for the make and model mower you are using.

Avoid possible death or serious injury from unapproved parts or modifications:

- Do not substitute common hardware for original manufacturer's blade bolts or other special part items.
- Do not substitute for blades, pins, shields or other critical parts.
- Do not use higher strength bolts to replace original manufacturer's shear bolts.

# Perform Maintenance Safely

## Prepare Yourself

Wear personal protective clothing and Personal Protective Equipment (PPE) issued to you or called for by job conditions. You must **ALWAYS** wear safety glasses with side shields.

You may also need:

- Hard hat
- Safety shoes
- Safety glasses, goggles or face shield
- Apron and gloves
- Hearing protection
- Welding helmet or goggles
- Respirator or filter mask

Wear whatever is needed—don't take chances.

**Keep hands—and clothing—away from all moving parts.** Don't wear dangling ties, loose sleeves, rings, watches, or long hair.

**WARNING!** Prevent death or serious injury from entanglement. **Do not wear loose clothing or accessories. Stay away from all rotating components when the engine is running.** Contact, wrapping or entanglement with rotating or moving parts could result in death or serious injury.



**Avoid  
Rotating Parts**



**Avoid  
Pinch Points**

# Perform Maintenance Safely

Wear a rubber apron and rubber gloves when working with corrosives. Wear gloves and safety shoes when handling wooden blocks or sharp-edged metal.

Always use safety glasses, goggles or a face shield. They provide eye protection from fluids under pressure, during grinding and while servicing batteries. Protection is also needed from flying debris, liquids and loose material produced by equipment, tools and pressurized air/water.

Wear a face shield and follow manufacturer's instructions when you disassemble spring-loaded components or work with battery acids. Wear a welding helmet or goggles with a shaded filter when you weld or cut with a torch.

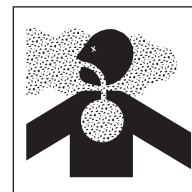
Do not sand, grind, flame-cut, braze or weld without a NIOSH-approved respirator or appropriate ventilation. If welding is required on this machine, refer to the manufacturer's operator's or service manuals or consult your equipment dealer for proper procedures.

Keep pockets free of all objects that could fall out—and drop into machinery.

Handle tools and heavy parts sensibly—with regard for yourself and other persons. Lower items—don't drop them.



**Clean  
Slippery Surfaces**



**Ventilate  
Work Area**

## Prepare The Work Area

- Position the mower in a level area out of the way of other working equipment.
- Make sure there is adequate light, ventilation and clearance.
- Remove oil, grease or water to eliminate any slippery surfaces.
- Clean around the area to be serviced to minimize contamination.

# Perform Maintenance Safely

## Prepare The Machine

Stored energy sources (electrical, mechanical, hydraulic, pneumatic, chemical, thermal, etc.) must be controlled or reduced to a practical minimum before performing any maintenance, repair or service procedures.

### Safety practices to prevent potential injuries from energy-releasing sources:

- Disengage PTO before shutting off engine.
- Place controls in PARK or NEUTRAL before shutting off engine.
- Set parking brake or block wheels.
- Allow all moving parts to stop.
- Lower mower to ground.
- Lower wings to ground on wing mowers.
- Shut off tractor engine.
- Relieve hydraulic system pressure by moving controls several times in all directions.
- Lock ignition, remove key and take it with you.
- Look and listen for evidence of moving parts before dismounting.
- Securely support or block up mower before working underneath mower or other lifted components.
- Securely support, block up, or lock up mower wings with approved locking devices before working near or underneath a wing mower.
- Relieve pressure before disconnecting or disassembling any pressurized system.
- Block or relieve spring pressure before disassembling any spring-loaded mechanism.
- Securely support or block up any raised machine component before working on it.
- Avoid flames, sparks, or smoking near any fuel, hydraulic fluid or other flammable material such as mowing debris.



Prepare  
Machine Systems  
for Service

# Perform Maintenance Safely

Attach a “DO NOT OPERATE” warning tag to the control levers and remove the ignition key if the mower should not be operated. Take the key with you.

Install approved support device(s) when working under or near raised equipment.

**WARNING!** Unsupported raised mowers or other equipment may drop unexpectedly. **Never go under equipment when raised unless supported by an approved support device(s).** Death or serious crushing injury could result from falling equipment.

Remove only guards or covers that provide access to the area being serviced. Replace all guards and covers when work is complete.



Use a  
“Do Not Operate”  
Tag



Use  
Approved  
Support Device



Replace  
All Guards

# Perform Maintenance Safely

## Use Proper Ventilation

If it is necessary to run an engine in an enclosed area, remove the exhaust fumes from the area with an exhaust pipe extension. If you do not have an exhaust pipe extension, make sure you open the doors and get outside air into the area.

**WARNING!** Prevent possible injury. **Never work on machinery with the engine running unless instructed by the manufacturer's manuals for specific service.**

**WARNING!** Never operate any type of engine without proper ventilation—EXHAUST FUMES CAN KILL.

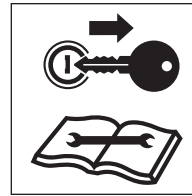
## Use Jacks And Hoists Carefully

Safety stands or blocks must be located on a rigid part of the mower. Do not position stands under axles or wheel supports that may rotate.

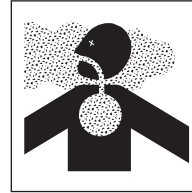
If you must work beneath raised equipment, always use wood—**not concrete**—blocks, jack-stands or other rigid and stable supports. When using jacks or hoists always be sure they are adequately supported.

**WARNING!** Prevent possible crushing injury. **Never use concrete blocks for supports.** They can collapse under even light loads.

Make sure the hoists or jacks you use are in good repair. Never use jacks with cracked, bent, or twisted parts. Never use frayed, twisted or pinched cables. Never use bent or distorted hooks.



Remove  
Key and Read  
Maintenance  
Manual



Ventilate  
Work Area



Use Proper  
Support for Raised  
Equipment

# Perform Maintenance Safely

## Common Maintenance Safety Practices

### Fuel Hazards

**WARNING!** Always use approved fuel containers and/or dispensing equipment.

Fuels are flammable, so observe these practices to reduce the possibility of a serious accident.

- Shut off engine and ignition during refueling.
- Always ground the fuel nozzle against the filler neck to avoid sparks.
- Keep sparks and open flames away from fuel.
- Do not smoke while refueling or when handling fuel containers.
- Do not cut or weld on or near fuel lines, tanks or containers.
- Do not overfill the tank or spill fuel. Clean up spilled fuel immediately.

### Engine Coolant Hazards

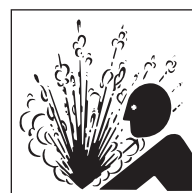
Liquid cooling systems build up pressure as the engine gets hot, so **use extreme caution before** removing the radiator cap.

Be sure to:

- Stop the engine and wait for the system to cool.
- Wear protective clothing and safety glasses.
- Turn the radiator cap slowly to the first stop to allow the pressure to escape before removing the cap completely.



No Smoking  
and No Open  
Flames



Remove  
Radiator Cap  
Slowly



# Perform Maintenance Safely

## Hydraulic System Hazards

The hydraulic system is under pressure whenever the engine is operating and may hold pressure even after the engine is shut off. Cycle all hydraulic controls including the auxiliary hydraulic control after the engine is shut down. Relieve trapped pressure in the lines after the attachments are shut down and resting on the ground.

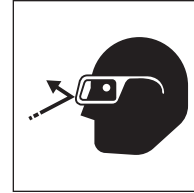
During inspection of the hydraulic system:

- Wait for fluid to cool before disconnecting the lines. Hot hydraulic fluid can cause SEVERE BURNS.
- **Do not** use your hand to check for leaks. Instead, use a piece of cardboard or paper to search for leaks.
- Wear appropriate eye protection. Hydraulic fluid can cause permanent eye injury.

**WARNING!** Hydraulic fluid under pressure can penetrate the skin or eyes and cause serious injury, blindness or death. Fluid leaks under pressure may not be visible. **Use a piece of cardboard or wood to find leaks, not your hand. Wear a face shield or safety goggles for eye protection.** If fluid is injected into the skin, it must be removed within a few hours by medical personnel familiar with this type of injury.

When venting or filling the hydraulic system, loosen the filler cap slowly and remove it gradually.

**Never** reset any relief valve in the hydraulic system to a pressure higher than recommended by the manufacturer.



**Wear  
Eye Protection**



**High Pressure  
Fluid Can Inject  
Into the Body**

# Perform Maintenance Safely

## Electrical System Hazards

Before working on the electrical system, disconnect the battery cable(s).

- Remove the battery negative (-) cable(s) first.
- When reconnecting the battery, connect the battery negative (-) cable(s) last.

The liquid in batteries contains acid, which is a POISON and can cause SEVERE CHEMICAL BURNS.

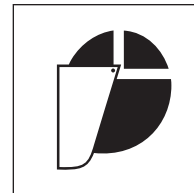
## Avoid Injury

- Wear a face shield to prevent contact with your eyes.
- Wear chemical-resistant gloves and clothing to keep electrolyte off your skin and regular clothing.

**WARNING!** Electrolyte will damage eyes or skin on contact. **Always wear a face shield to avoid electrolyte in eyes.** If electrolyte contacts eyes, flush immediately with clean water and get medical attention.

**Wear chemical-resistant gloves and protective clothing to keep electrolyte off skin.** If electrolyte contacts exposed skin or clothing, wash off immediately

with clean water. **If electrolyte is ingested**, seek medical attention immediately. NEVER give fluids that would induce vomiting.



**Wear  
Face Protection**



**Wear  
Protective  
Clothing**

# Perform Maintenance Safely

## Avoid Explosion

**WARNING!** Avoid possible serious injury from explosion. Lead-acid batteries produce extremely explosive gases especially when being charged. **Keep arcs, sparks, flames and lighted tobacco away.**

- **Do not** smoke near batteries.
- Keep arcs, sparks and open flames away from batteries.
- Provide adequate ventilation.

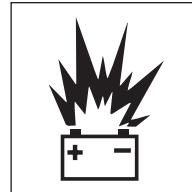
**Never** check the battery by placing a metal object across the battery posts — the resulting spark could cause an explosion.

**WARNING!** Avoid possible serious injury from battery explosion. **Do not charge a battery or boost start the engine if the battery is frozen.** Warm to 60°F (15.5°C) or the battery may explode and could cause serious injury.

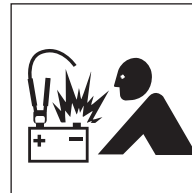
Safety rules during battery boost starting:

- Follow the instructions for proper “battery boost starting” as specified in the manufacturer’s manual.
- Be sure the machines are not touching.

- Observe the polarity of the batteries and connections.
- Make the final cable connection to the engine or the furthest ground point away from the battery. Never make the final connection at the starter or dead battery—sparks may ignite the explosive gases present at the battery.
- When disconnecting cables after jump starting, remove the cables in reverse order of connection (e.g., final connection first).



**Avoid Sparks  
and Open Flames  
Near Batteries**



**For  
Boost Starting  
Observe Polarity  
and Make Final  
Connection at  
Ground Point**

# Perform Maintenance Safely

## Tire And Wheel Maintenance

Check your tires and wheels daily because the stability of the tractor and mower can be dramatically affected by tire pressure or damage to tires or wheels.

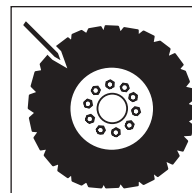
Check tires for:

- Correct pressure.
- Cuts and bulges.
- Nails or other punctures.
- Uneven or excessive wear.
- Condition of valve stems and caps.

Check wheels for:

- Damage to the rims.
- Missing or loose lug nuts or bolts.
- Misalignment.

All tire service should be performed by a qualified tire service center or by an authorized service person who has been properly trained in the procedures and use of safety equipment designed for tire servicing.



**Check Tires  
and Wheels for  
Damage**



**Maintain  
Proper Tire  
Pressure**



# Perform Maintenance Safely

## Tire And Wheel Maintenance (continued)

**WARNING! The types of wheels and tires usually found on this equipment require special care when servicing to prevent death or serious injury.**

Do not inflate the tires above the recommended pressure. Be sure to replace tire ballast if equipped. See manufacturer's specifications for ballast requirements.

Keep wheel lug nuts tightened to manufacturer's recommendations.

A rise in tire pressure during operation is normal, and should NOT be reduced.

Never reinflate a tire that has been run flat or seriously underinflated without removing the tire from the wheel. Have the tire and wheel closely inspected for damage before remounting.

When adding air to a tire, do so from a distance. Use a long hose with self-attaching chuck. Always stand behind tread when adjusting tire pressure.

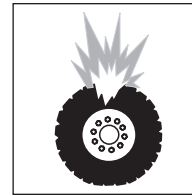
Do not inflate tires with flammable gases or from systems using an alcohol injector.

Never cut or weld on a wheel with an inflated tire mounted on it. This could cause explosive decompression.

Check that the tire size and wheel are correctly matched.

When replacing the tires, ensure the tires are of the appropriate rating specified by the manufacturer.

Tires should not be operated at speeds higher than their rated speed. Most agricultural tires are rated for 20mph maximum speed.



# Perform Maintenance Safely

## Complete Service And Repairs Before Machine Is Released

Tighten all bolts, fittings, and connections to torques specified by the manufacturer.

Install all guards, covers, and shields after servicing. Replace or repair any damaged parts. Refill and recharge pressure systems only with manufacturer approved or recommended fluids.

Start the engine and check for leaks. (See page 23, **Hydraulic System Hazards**.) Operate all controls to make sure the tractor and mower are functioning properly. Test the machine if necessary. After testing, shut down and check the work you performed. Are there any missing cotter pins, washers, locknuts, etc.? Recheck all fluid levels before releasing the equipment for operation.

All parts should be inspected during repair and replaced if worn, cracked or damaged. Excessively worn or damaged parts can fail and cause injury or death.

Replace any damaged or illegible safety signs.



## Mower Blade Maintenance

Do not take chances using damaged or bent blades. The mower manufacturers from the Association of Equipment Manufacturers (AEM) and the Farm Equipment Manufacturers Association (FEMA) advocate that you DO NOT reuse, straighten, hard face or weld mower blades. Death or serious injury could result if a broken blade is thrown from a mower.

# Perform Maintenance Safely

## Mower Blade Maintenance (continued)

### — How are mower blades made?

Mower blades are made of high strength alloy spring steel. They are hot-forged and shaped to meet the manufacturer's individual specifications, then heat treated and tempered to a high strength, ductile state to reduce the possibility of breaking while mowing. Blades are tested to ensure they meet strength, hardness, and ductility standards. If a blade fails to meet any of these specifications, it will not be used on the mower.

### — What happens when a mower blade bends?

It takes a great amount of impact force to bend the blade. This impact force often results in the blades being gouged or chipped. After a blade is damaged by a gouge or chip a blade failure is much more likely to occur. When a blade is severely bent, a microscopic crack may be created in the blade. Straightening the blade does not remove or repair this crack, but may cause additional cracks. Additional stresses during mowing operations can result in an unexpected blade failure.

- **Avoid bending blades.** Help prevent mower blades from bending or cracking by avoiding contact with solid objects. Mower blades are intended to cut grass, shrubs, woody vegetation, and small trees and limbs. They are not intended to contact solid objects such as rocks, concrete, or steel posts. Inspect the area prior to mowing. Remove or clearly mark any solid objects and mow around them.
- **Replace damaged blades!** Inspect the mower blade(s) daily or after hitting any solid object. If a mower blade becomes damaged (bent, gouged, cracked) or worn more than 25 percent of the original size, it should be removed and replaced with a new blade. Always use the original manufacturer's blades. Aftermarket brand blades may not meet the mower manufacturer's strength, hardness and ductility requirements.
- **Do not take chances mowing with damaged or bent blades.** Using a damaged or straightened mower blade can result in the blade breaking and being thrown into the operator or a bystander causing death or serious injury. The price of a new blade is small compared to the potential for the serious injury that could result from a bent or broken blade being thrown from the mower.

## Final Word To The User

You have just finished reading the AEM Industrial and Agricultural Mower Manual. It is impossible for this manual to cover every safety situation that you may encounter on a daily basis. Your knowledge of these safety precautions and your application to the

basic rules of safety will help to build good judgment in all situations. Our objective is to help you develop, establish and maintain good safety habits to make operating an Industrial and Agricultural Mower easier and safer for you.

This manual is another in a series on the safe operation of machinery published by AEM. Many pictorials in this safety manual can be found and downloaded at <http://pictorials.aem.org>. For additional publications visit our website at [www.safetymaterials.org](http://www.safetymaterials.org).



ASSOCIATION OF  
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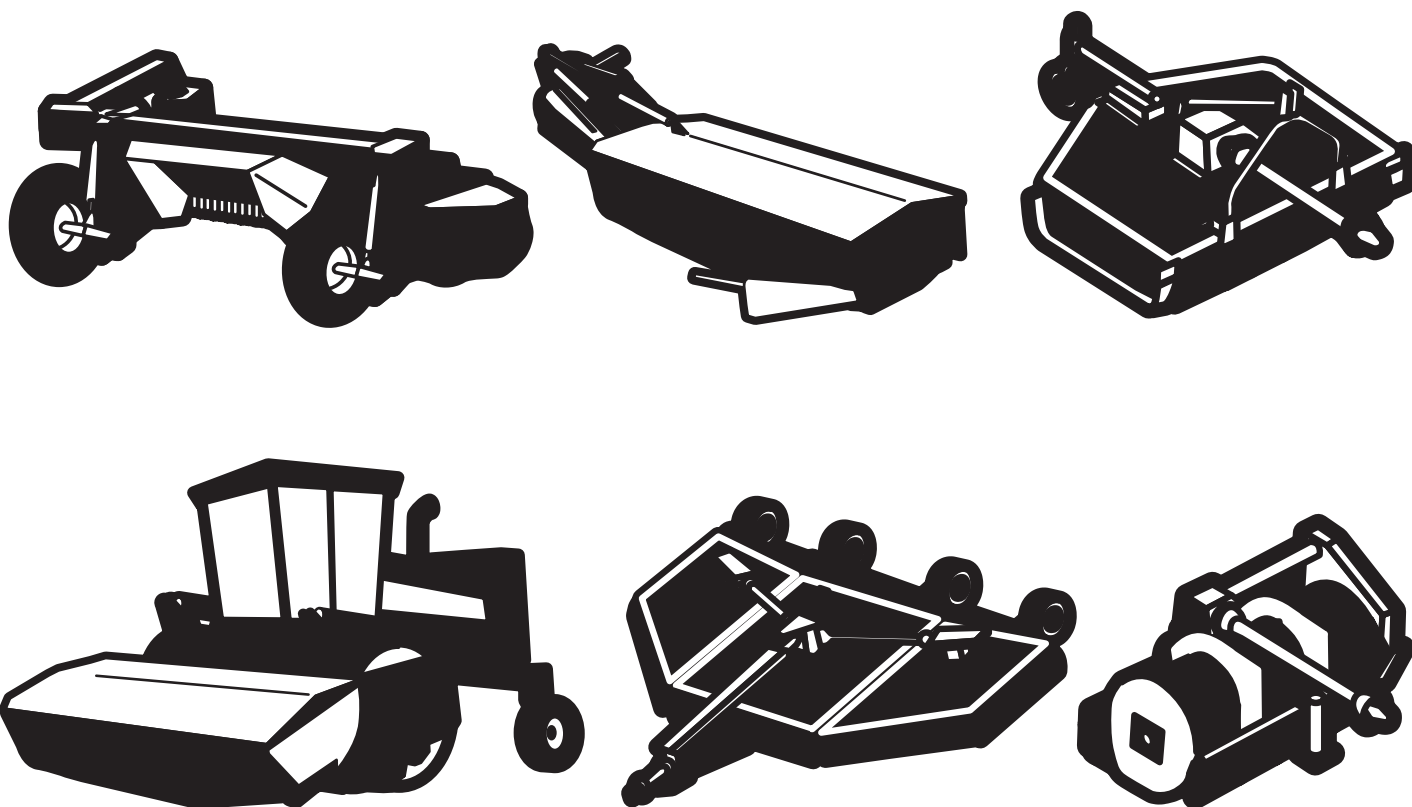
┌ CORTADORA  
DE CÉSPED INDUSTRIAL/  
└ PARA AGRICULTURA ┘

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# MANUAL DE SEGURIDAD

PARA EL PERSONAL DE OPERACIONES Y MANTENIMIENTO



FORMULARIO IAMSE-1009  
Impreso en los EE.UU.

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## Reconocimiento

Deseamos reconocer las contribuciones de los miembros del Consejo de Fabricantes de Cortadoras de Césped Industriales/para Agricultura para la preparación de este Manual de seguridad.

### AVISO DE PROTECCIÓN DE COPYRIGHT

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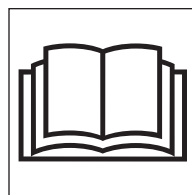
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Revisado el 01/03, 09/10

## Introducción

Este manual de seguridad está destinado a señalar algunas de las situaciones de seguridad básicas que pueden surgir durante la operación y el mantenimiento normales de la máquina y a instruirlo en prácticas de seguridad para manejar estas condiciones. Este manual **NO** sustituye los manuales del operador del fabricante de la cortadora de césped.

Puede ser necesario tomar precauciones adicionales o algunas de las instrucciones pueden no ser pertinentes, dependiendo del equipo, los accesorios y las condiciones del sitio de trabajo o del área de servicio. El fabricante no tiene control directo sobre la aplicación, la operación, la inspección o el mantenimiento del equipo. Por lo tanto, es **SU** responsabilidad utilizar prácticas de seguridad correctas en estas áreas.

La información que se proporciona en este manual complementa la información específica sobre la máquina que contienen los manuales del operador del fabricante. Puede haber otra información que afecte la operación segura de la máquina en los letreros de seguridad o en los requisitos del seguro, programas de seguridad y capacitación del empleador, códigos de seguridad, leyes federales, locales, estatales o provinciales, reglas y ordenanzas.



**Lea y asegúrese  
de comprender los  
manuales antes  
de comenzar la  
operación**



**¡IMPORTANTE!** Antes de hacer funcionar la cortadora de césped, asegúrese de contar con los manuales del operador del fabricante para esta máquina y todos los accesorios. Si faltan los manuales del fabricante, solicite manuales de repuesto a su empleador, al concesionario de los equipos o directamente al fabricante. Guarde este manual de seguridad y los manuales del fabricante con la máquina en todo momento. Lea y asegúrese de comprender todos los manuales.

Se encuentra disponible el video AEM Mower Safety Practices (Prácticas de seguridad para la cortadora de césped de AEM) para capacitar y reforzar prácticas de seguridad correctas. Se alienta a los operadores a ver periódicamente el video de seguridad.

# Alertas de seguridad

## Símbolo

Este símbolo de alerta de seguridad significa:  
**“¡ATENCIÓN! ¡MANTÉNGASE ALERTA! ¡SU SEGURIDAD ESTÁ EN RIESGO!”**

El símbolo de alerta de seguridad identifica mensajes de seguridad importantes sobre el equipo, sobre letreros de seguridad, en manuales u otros lugares. Cuando vea este símbolo, manténgase alerta ante la posibilidad de muerte o lesiones personales. Siga las instrucciones del mensaje de seguridad.



Motivos por los cuales la seguridad es importante:

- Los accidentes provocan discapacidad y muerte.
- Los accidentes cuestan.
- Los accidentes pueden evitarse.

## Palabras indicativas

Las palabras indicativas son palabras distintivas que típicamente se encontrarán en letreros de seguridad de la cortadora de césped y otros equipos del sitio de trabajo. Estas palabras también se pueden encontrar en este manual y en los manuales del fabricante. Están destinadas a alertar al operador sobre un riesgo y el grado de gravedad del riesgo.



**DANGER (PELIGRO)** indica una situación riesgosa que, si no se evita, resultará en una lesión grave o la muerte.



**WARNING (ADVERTENCIA)** indica una situación riesgosa que, si no se evita, podría resultar en una lesión grave o la muerte.



**CAUTION (PRECAUCIÓN)** indica una situación que, si no se evita, podría resultar en lesiones leves o moderadas.



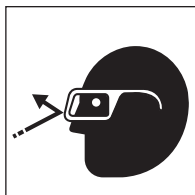
**NOTICE (AVISO)** indica un mensaje de daños a la propiedad.

# Palabras para el usuario/operador

Es **SU** responsabilidad leer y asegurarse de comprender el manual de seguridad y los manuales del fabricante antes de hacer funcionar esta máquina. Este manual de seguridad lo lleva paso a paso a través de su día de trabajo.

**El reconocimiento de los riesgos y la prevención de accidentes** dependen de que usted esté alerta, sea cuidadoso y se capacite correctamente para la operación, el transporte, el mantenimiento y el almacenamiento de este equipo.

Se han suministrado gráficos útiles para comprender el texto.



Recuerde que **USTED** es la clave de la seguridad. Las prácticas de seguridad correctas lo protegen no sólo a usted sino también a las personas que lo rodean. Estudie este manual y los manuales del fabricante para su máquina en particular. Transfórmelos en una parte activa de su programa de seguridad. Tenga presente que este manual de seguridad está escrito para cortadoras de césped industriales/para agricultura.

Contáctese con el fabricante del equipo si le queda alguna pregunta sobre la operación segura después de estudiar los manuales del operador del fabricante y este manual de seguridad.

**Tome todas las demás precauciones habituales y acostumbradas para un trabajo seguro y, sobre todo:**

**RECUERDE:**

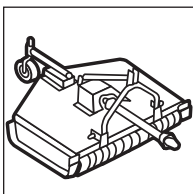
**¡LA SEGURIDAD DEPENDE DE USTED!**

**¡PUEDE EVITAR LESIONES GRAVES O MUERTE CAUSADAS POR PRÁCTICAS LABORALES NO SEGURAS!**

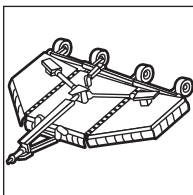
# Cortadora de césped industrial/para agricultura

## Tipos de cortadora de césped industrial/para agricultura

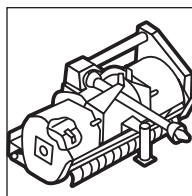
Las cortadoras de césped se usan para recortar pasturas, desmenuzar residuos de cultivos, cortar arbustos, realizar desbroce pesado, cortar la hierba en vías de agua, derechos de paso, costados de caminos o autopistas. Además, estas cortadoras se usan para cortar la hierba y otras plantas en zonas públicas como parques y cementerios.



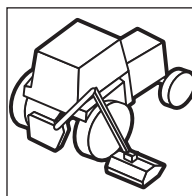
Giratorio



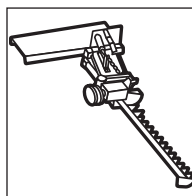
Giratorio con lateral plegable



Triturador



Aguilón



Barra en forma de hoz

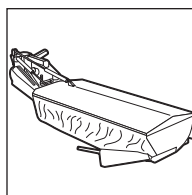
# Cortadora de césped industrial/para agricultura

## Tipos de cortadora de césped de disco para agricultura

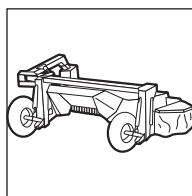
Las cortadoras de césped de disco están diseñadas y equipadas para cortar cultivos de heno a mayor velocidad de desplazamiento.

Las cortadoras/acondicionadoras de disco cortan y acondicionan los cultivos.

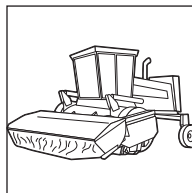
Las formadoras de hileras autopropulsadas cortan el heno y lo acondicionan en hileras.



Cortadora de césped de disco



Cortadora/  
acondicionadora de  
disco



Formadora de hileras  
autopropulsada

# Cumplimiento del programa de seguridad

## Protéjase a sí mismo

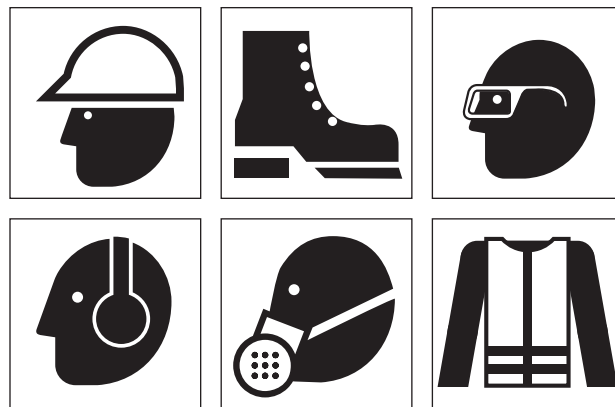
Use la ropa de protección personal y los equipos de protección personal (PPE) que se le proporcionen o que requieran las condiciones del trabajo. **SIEMPRE** debe usar gafas de seguridad con escudos laterales.

Puede necesitar también:

- Casco
- Calzado de seguridad
- Antiparras de seguridad o protección facial
- Guantes gruesos
- Protección para oídos
- Indumentaria reflectiva
- Indumentaria impermeable
- Respirador o máscara con filtro

Use la ropa necesaria; no corra ningún riesgo.

**¡ADVERTENCIA!** Evite lesiones graves o muerte por enredos. **No use ropa floja ni accesorios. Ate el cabello largo. Manténgase alejado de todos los componentes giratorios cuando el motor está en funcionamiento.** El contacto, el enrollado o el enredo con piezas giratorias o móviles podrían resultar en lesiones graves o la muerte.



Evite quedar enredado

# Cumplimiento del programa de seguridad

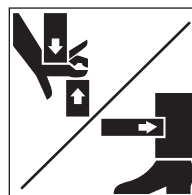
- Lea, asegúrese de comprender y siga las instrucciones escritas del fabricante que se encuentran en el manual del operador y en los letreros de seguridad sobre la cortadora y el tractor.
- Obtenga capacitación para la operación de la cortadora y el tractor.
- Aproveche los programas de capacitación que se ofrecen en su zona.
- Solicítele al distribuidor de equipos o al supervisor que le explique cualquier información que no comprenda.
- Explique las instrucciones escritas de los manuales del operador y los letreros de seguridad a los usuarios u operadores que no puedan leerlas.
- Inspeccione la cortadora y el tractor diariamente antes de hacerlos funcionar. Asegúrese de que todas las guardas se encuentren en su lugar y de que el equipo funcione correctamente.
- Nunca fume mientras lo está manejando. Nunca llene el depósito de combustible con el motor en funcionamiento o cerca de una llama abierta.
- Asegúrese de tener visibilidad adecuada e iluminación suficiente.
- Sepa cuáles son los puntos donde puede quedar atrapado y las partes giratorias. Su conocimiento puede evitar accidentes.
- Nunca intente hacer funcionar los controles, excepto desde el asiento del operador. Las funciones controladas de manera incorrecta pueden producir el movimiento imprevisto de la máquina y resultar en lesiones graves o muerte.
- Apague la cortadora y el tractor antes de descender. (Consulte la página 18, **Prácticas correctas de apagado de los equipos.**)



Lea, asegúrese de comprender y siga las indicaciones de los manuales y los letreros de seguridad



Evite las partes giratorias



Sepa cuáles son y evite los puntos donde pueda quedar atrapado



# Cumplimiento del programa de seguridad

## Evite las lesiones provocadas por equipos elevados

Evite posibles lesiones de aplastamiento por caídas de la cortadora u otros equipos elevados.



**Evite ser aplastado –  
Bloquee o apoye  
con seguridad la  
cortadora**

Antes de trabajar cerca o debajo de partes levadas de la cortadora o de los equipos:

- Apoye o bloquee con seguridad las partes elevadas de la cortadora o los equipos de acuerdo con el manual del operador.
- Apoye, bloquee o trabee con seguridad los laterales con dispositivos de bloqueo aprobados o descienda las partes de la cortadora o de los equipos hasta el suelo.
- Use trabas de transporte cuando transporte la cortadora por la vía pública.

## Evite lesiones producidas por líquidos a alta presión

Evite las lesiones por inyección de fluidos debidas a fugas de líquidos a alta presión.



**El fluido a alta  
presión puede  
inyectarse en el  
cuerpo**

# Cumplimiento del programa de seguridad

## Evite lesiones por incendios y explosiones

Aplique el freno de estacionamiento, apague el motor de la cortadora y del tractor y retire la llave mientras llena el depósito de combustible. Tenga precaución adicional cuando carga combustible en un motor caliente. Nunca fume mientras carga combustible. Evite las chispas conectando a tierra la boquilla de combustible contra el cuello de llenado del depósito.

Los vapores de un depósito de combustible vacío son explosivos. Nunca suelde o realice cortes en líneas, depósitos o contenedores de combustible.

Retire toda la basura o los residuos de corte de la máquina todos los días o según sea necesario. Mantenga los residuos alejados del motor, el escape, los embragues y otras fuentes de calor. Use supresores de chispas, según corresponda, en el sistema de escape del motor. Asegúrese de que no haya trapos con aceite u otro material inflamable almacenado en la máquina.

Revise en busca de fugas de combustible, aceite o fluido hidráulico. Repare las fugas y limpie la máquina antes de hacerla funcionar.

El éter/fluido para arranque en frío es inflamable. No fume cuando usa éter/fluido para arranque en frío. Siempre siga las instrucciones del recipiente y de los manuales del

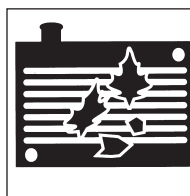
operador del fabricante correspondientes a la cortadora de césped. No use éter/fluido para arranque en frío si el motor está equipado con bujías de precalentamiento u otro dispositivo de precalentamiento.

Siempre use solvente no inflamable para limpiar las partes. No use gasolina, combustible diesel u otros fluidos inflamables. Almacene todos los fluidos y materiales inflamables lejos de la máquina y de la zona de trabajo.

Sepa dónde se guardan los extintores de incendios, cómo funcionan y para qué tipo de incendio están destinados. Verifique la disponibilidad de los extintores de incendios de acuerdo con las instrucciones del fabricante. Asegúrese de que cada tractor esté equipado con un extintor de incendios.



**No fumar;  
evitar las llamas  
abiertas**



**Retire los  
residuos a diario  
o según sea  
necesario**



# Cumplimiento del programa de seguridad

## ¡Manténgase alerta!

Sepa dónde obtener asistencia. Sepa cómo usar un equipo de primeros auxilios y un extintor de incendios/sistema de supresión de fuego.

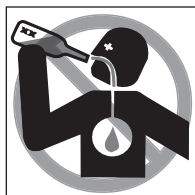
## ¡Manténgase informado!

Aproveche los programas de capacitación que se ofrecen.

## ¡Tenga cuidado!

El error humano es causado por muchos factores: descuido, fatiga, sobrecarga, preocupación, desconocimiento de la máquina por parte del operador, fármacos y alcohol, entre muchos otros. Los daños al tractor o la cortadora de césped se pueden arreglar en un tiempo breve, pero las lesiones o la muerte tienen un efecto perdurable.

Por su seguridad y la de los demás, aliente a sus compañeros de trabajo a actuar con seguridad.



**Nunca use  
fármacos o alcohol  
mientras está  
operando la máquina**

## Para una operación segura

Usted debe ser un operador cualificado y autorizado para operar la máquina correctamente. Debe comprender claramente las instrucciones por escrito que proporciona el fabricante, recibir capacitación (que incluya la operación real de la cortadora de césped) y conocer las reglas y ordenanzas de seguridad correspondientes al sitio de trabajo. Una buena práctica de seguridad consiste en señalar y explicar los letreros y las prácticas de seguridad y asegurarse de que otras personas comprendan la importancia de seguir estas instrucciones.

**¡ADVERTENCIA!** Los fármacos y el alcohol afectan la capacidad de alerta y de coordinación del operador, así como su capacidad para operar los equipos con seguridad. **Nunca use fármacos o alcohol mientras opera el equipo de la cortadora. Nunca permita a sabiendas que otra persona opere esta máquina con la capacidad de alerta o coordinación deteriorada.**

Un operador que toma un medicamento recetado o de venta libre debe consultar a un profesional médico con respecto a los efectos colaterales del medicamento que podrían reducir su capacidad de operar este equipo con seguridad.

# Cumplimiento del programa de seguridad

## Conozca las reglas

La mayoría de los empleadores tienen reglas que rigen la operación y el mantenimiento de los equipos. Antes de comenzar a trabajar en una ubicación nueva, verifique con el supervisor o con el coordinador de seguridad. Averigüe sobre las reglas que tendrá que obedecer.

La Administración de Seguridad y Salud Ocupacional (Occupational Safety and Health Administration, OSHA) hace cumplir leyes federales dentro de los EE.UU. que se aplican a la operación, la aplicación y el mantenimiento seguros de equipos en un sitio de trabajo. Es responsabilidad del empleador cumplir estas leyes. Un representante de OSHA puede visitar periódicamente un sitio de trabajo para ver si estas leyes se cumplen.

También puede haber leyes estatales/provinciales o locales u ordenanzas internacionales que se apliquen a este equipo y a su uso, junto con reglas específicas del sitio de trabajo o del empleador. Es importante que conozca y cumpla todas las leyes y reglas aplicables, incluso las que requieren capacitación y certificación del operador.

**Las siguientes son algunas de las reglas que debe cumplir al trabajar:**

- Un ROPS (sistema de protección antivuelco) y un tractor equipado con cinturón de seguridad es exigencia del

gobierno federal (OSHA) para la protección de los operadores durante el funcionamiento de la cortadora. Una cabina cerrada proporciona protección adicional para el operador con respecto a objetos arrojados. Verifique el manual del operador de la cortadora de césped para ver si también se requiere una cabina de tractor.

- Use y verifique que otras personas usen la indumentaria y los equipos de protección personal correctos.
- Inspeccione la máquina y los accesorios antes de cada uso según lo especificado por el fabricante y por su empleador.
- Conozca las limitaciones y las características operativas del equipo de corte de césped. No haga un uso indebido.
- Verifique que todos los escudos y las guardas estén correctamente instalados antes de hacer funcionar la máquina.
- Nunca modifique o retire partes de la máquina (excepto para realizar servicios; después, asegúrese de que se vuelvan a colocar en su lugar).

### Reglas de seguridad

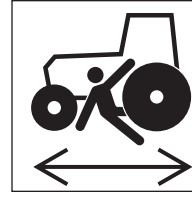
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**Sepa cuáles son  
y asegúrese de  
comprender las reglas  
de funcionamiento**

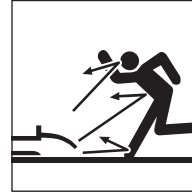
# Cumplimiento del programa de seguridad

## Algunas reglas que debe cumplir al trabajar (continuación)

- Únicamente personas cualificadas y autorizadas pueden manejar estos equipos.
- **Nunca permita que los niños jueguen** en los equipos, **vianen** en ellos o los hagan **funcionar**. Los niños **no están** cualificados para manejar estos equipos.
- **No** transporte pasajeros.
- Use contacto en tres puntos (asideros y peldaños) y enfrente el equipo al ascender o descender de él.
- Mantenga a las personas ajenas a 300 pies (92 m) de la operación de corte.
- Familiarícese con el sitio de trabajo antes de usar la cortadora de césped. Tenga en cuenta posibles riesgos que puede encontrar en el terreno. Retire o marque los obstáculos y residuos que podrían dañar la cortadora o ser arrojados por ella.
- Utilice sólo accesorios y partes aprobados por el fabricante de la cortadora de césped.
- Asegúrese de que todos accesorios estén descendidos, aplique el freno de estacionamiento, apague el motor y haga funcionar todas las palancas de control. Retire la llave antes de salir del tractor. (Consulte la página 18, **Prácticas correctas de apagado de los equipos.**)
- Cuando transporte la cortadora de césped en un remolque, siga las instrucciones detalladas del fabricante para la carga, el amarre y la descarga de la cortadora.



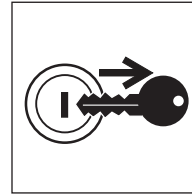
Mantenga a los niños alejados de los equipos



Mantenga a las personas ajenas alejadas



No lleve pasajeros



Apague los equipos cuando están sin vigilancia

# Cumplimiento del programa de seguridad

## Conozca los equipos

Lea y asegúrese de comprender los letreros de seguridad que indican PELIGRO, ADVERTENCIA, PRECAUCIÓN y AVISO y otros letreros informativos que hay sobre el tractor y la cortadora de césped y en el manual del operador del fabricante. Solicítele al supervisor o al distribuidor de la cortadora que le explique cualquier información que no comprenda. El incumplimiento de las instrucciones de seguridad podría resultar en lesiones graves o muerte.

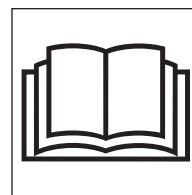


Lea y asegúrese de comprender todos los letreros de seguridad

Asegúrese de que todas las estructuras de protección, guardas, escudos, pantallas y paneles del fabricante están bien reparados, en su lugar y bien ajustados. Los componentes de seguridad dañados, faltantes o debilitados pueden crear una situación de riesgo para usted como operador. **Nunca** retire o modifique ningún componente de seguridad (incluso escudos para objetos arrojados) que haya en la cortadora.

## Conozca lo siguiente sobre el tractor y la cortadora de césped:

- Funcionamiento, propósito y uso de todos los controles.
- Velocidades de funcionamiento correctas.
- Capacidades y funcionamiento correcto en pendientes y terrenos desparejos.
- Características del frenado y la dirección.
- Radio de giro y separaciones.
- Cómo detener los equipos rápidamente en una emergencia.



Lea y asegúrese de comprender los manuales antes de comenzar la operación

# Preparación para una operación segura

## Revise los equipos de la cortadora de césped y el tractor

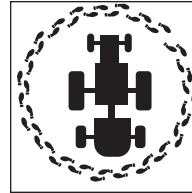
Antes de comenzar la jornada de trabajo, inspeccione la máquina y asegúrese de que todos los sistemas estén en buenas condiciones operacionales.

**¡ADVERTENCIA!** Evite posibles lesiones por aplastamiento producidas por equipos que caen. La falla del sistema hidráulico o de una parte podría causar la caída de equipos que no están apoyados. **No permanezca debajo de equipos elevados excepto que estén correctamente apoyados de acuerdo con el manual del operador.**

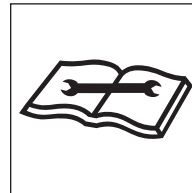
- Realice procedimientos de servicio diarios y periódicos según lo indicado por el fabricante del equipo.
- Verifique para detectar piezas faltantes, dañadas, rotas o flojas en el tractor y en la cortadora de césped. Repare o sustituya esas piezas.
- Verifique que los accesorios del tractor y la cortadora sean los correctos.
- Verifique que la clasificación nominal de velocidad de TDF del tractor y la cortadora sea la correcta.
- Verifique el estado de las hojas de la cortadora de césped. Sustituya las hojas que se encuentren gravemente gastadas, dobladas, agujereadas o

marcadas; incluya los pernos y sujetadores de las hojas. Nunca enderece o suelde en las hojas.

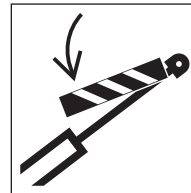
- Asegúrese de que el escudo para objetos que son arrojados se encuentre correctamente instalado y en buen estado. Repárelo o sustitúyalo si está dañado o falta.



Recorrida de inspección



Realice el mantenimiento de la máquina



Lea el manual – Bloquee o apoye con seguridad la cortadora

# Preparación para una operación segura

- Verifique que todos los escudos y guardas estén en su lugar y que todos los equipos se encuentren en buenas condiciones de funcionamiento. Esto incluye la línea motriz de la TDF, la caja de engranajes y las guardas y escudos de los implementos que se usan para proteger al operador.
- Verifique que los dispositivos de bloqueo del extremo en horquilla de la línea motriz estén correctamente enclavados.
- Verifique en busca de sistemas hidráulicos dañados o con fugas en el tractor o la cortadora. Repare o ajuste según sea necesario.

**¡ADVERTENCIA!** El fluido hidráulico bajo presión puede penetrar la piel o los ojos y causar lesiones graves, ceguera o la muerte. Las fugas de fluido bajo presión pueden no ser visibles. **Utilice un cartón o una madera para buscar fugas, no la mano. Use protección ocular.** Si el fluido se inyecta en la piel, debe ser extraído dentro de las próximas pocas horas por personal médico familiarizado con este tipo de lesión.

- Mantenga la superficie de la plataforma del operador limpia y libre de grasa, aceite, suciedad, nieve o hielo. Los peldaños y asideros deben estar limpios y funcionar correctamente.
- Asegúrese de que las luces de trabajo se mantengan limpias (si están instaladas). Verifique que todas las luces funcionen correctamente.

- Asegúrese de que el letrero de vehículo de movimiento lento, los y las luces de advertencia estén en buenas condiciones y puedan verse claramente.
- Asegúrese de que todas las herramientas y objetos sueltos se retiren o se sujeten con seguridad mientras se opera la máquina.
- Verifique que todos los letreros de seguridad se vean con claridad. Sustituya los letreros dañados.



Revise para detectar/guardas y escudos dañados



Verifique en busca de fugas e inspeccione las mangueras

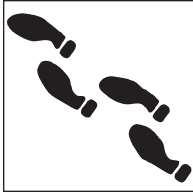


Aparte las reflectores herramientas

# Preparación para una operación segura

## Familiarícese con la zona de trabajo

Antes de hacer funcionar la cortadora de césped, inspeccione cuidadosamente la zona de trabajo. Recorra a pie alrededor de la zona e inspeccione las superficies sobre las cuales se desplazará cuando utilice la cortadora.



Recorra a pie  
alrededor del lugar  
de trabajo

Localice y evite:

- Agujeros
- Desmoronamientos
- Obstáculos (tocones)
- Excavaciones
- Agua estancada
- Lodo profundo
- Puntos mojados
- Suelo blando
- Puntos irregulares
- Líneas y aparatos eléctricos
- Otros servicios públicos
- Cualquier condición que podría causar una colisión, pérdida de control o vuelco
- Pendientes empinadas

Busque residuos y obstáculos recorriendo a pie la zona antes de cortar. Los objetos como alambre, cable, rocas, neumáticos y metales que podrían dañar o ser arrojados por la cortadora de césped deben retirarse o marcarse claramente y evitarse.

Corrija las condiciones no seguras. No opere en áreas con problemas donde no se puedan retirar o marcar los residuos y los obstáculos.

Analice la zona de corte para determinar:

- El procedimiento de corte más eficiente.
- La altura del material que debe cortarse.
- Las condiciones operativas del terreno.
- Cómo usar mejor el patrón de corte en sentido de avance.
- Las posibilidades de que personas ajenas o que pasan circunstancialmente queden expuestas a objetos que se arrojan.



Retire o marque  
los residuos y  
obstáculos

## Tenga cuidado con otras personas

Antes de poner en marcha los equipos:

- Recorra a pie alrededor de los equipos.
- Verifique en busca de personas debajo o cerca de los equipos.
- Retire a todas las personas de esas zonas.
- Haga sonar una advertencia.

# Preparación para una operación segura

## Ascienda y descienda del tractor correctamente

Siempre use contacto de tres puntos al ascender o descender del tractor o de la cortadora de césped. Enfrente la máquina al ingresar o salir de ella. Un contacto de tres puntos significa que tres de los cuatro miembros (brazos y piernas) están en contacto con la máquina en todo momento durante el ascenso y descenso.

Antes de ascender:

- Límpiase el calzado y las manos. Limpie la nieve, el hielo, el lodo o el aceite de los peldaños y asideros.

Durante el ascenso y el descenso:

- Use los asideros y los estribos.
- Nunca se aferre al volante o a los controles como asideros.
- Nunca ascienda o descienda de un tractor en movimiento.
- Nunca ascienda o descienda transportando herramientas u objetos que impidan el contacto de tres puntos. Deje en el piso las piezas o las herramientas. Manteniendo el contacto correcto, suba y, después, recoja el objeto.



Utilice contacto  
de tres puntos



Limpie las  
superficies  
resbaladizas

# Preparación para una operación segura

## Prueba de seguridad de los controles del tractor y de la cortadora de césped

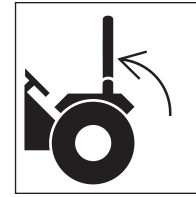
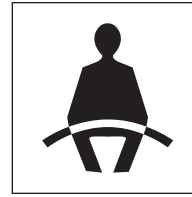
Arranque el tractor siguiendo los procedimientos específicos del manual del operador del fabricante. Estos procedimientos normalmente incluyen:

- Colóquese y ajústese el cinturón de seguridad en el tractor equipado con ROPS.
- Verifique que el freno de estacionamiento esté aplicado.
- Verifique que la TDF esté desenganchada.
- Verifique que todos los controles estén en la posición de estacionamiento.
- Advierta a otras personas en la zona antes de arrancar el tractor.
- Arranque el tractor siguiendo los procedimientos de arranque que recomienda el fabricante del tractor.

**¡ADVERTENCIA!** Evite lesiones graves o muertes producidas por el movimiento inesperado de la máquina. **Arranque el motor únicamente desde el puesto del operador. Nunca intente arrancar el motor haciendo un corto entre los bornes del arranque o tomando la llave desde el suelo o desde afuera de la cabina.**

Después del arranque:

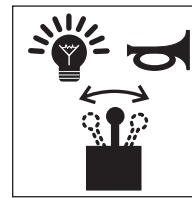
- Verifique que todos los instrumentos, indicadores y luces indicadoras funcionen normalmente.
- Verifique que todos los controles, la dirección y los frenos del tractor funcionen correctamente.



Use el ROPS  
y el cinturón de  
seguridad



Arranque  
únicamente desde  
el asiento del  
operador



Revise los  
instrumentos y  
controles

- Eleve y descienda la cortadora de césped en busca de problemas en el descenso total o el enganche de la línea motriz.
- Verifique los equipos en busca de vibraciones excesivas y ruidos anormales.

# Preparación para una operación segura

- Use las prácticas correctas de apagado de los equipos antes de inspeccionar equipos. Espere hasta que todo movimiento de los equipos se haya detenido antes de descender del tractor o la cortadora de césped.
- No haga funcionar la cortadora si el tractor y la cortadora de césped no funcionan correctamente. Coloque una etiqueta que indique “No poner en funcionamiento” en la máquina, retire la llave y no haga funcionar la cortadora hasta que el problema se haya corregido.

## Sistema de toma de fuerza (TDF)

Asegúrese de hacer funcionar el tractor a la velocidad de TDF indicada para la cortadora.

Al hacer funcionar tractores con sistemas de TDF impulsados por transmisión, una cortadora giratoria tiene un significativo efecto de rueda volante. La cortadora puede seguir propulsando un tractor con un sistema de TDF impulsado por transmisión.

El tractor debe estar equipado y funcionar como sigue:

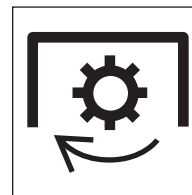
- Instale una línea motriz equipada con un embrague de sobrecarga.
- Prevea suficiente espacio y tiempo para maniobrar anticipando los giros, las paradas y las reducciones de velocidad.



No descienda hasta  
que el movimiento de  
los equipos se haya  
detenido



Use una etiqueta  
que indique  
“No poner en  
funcionamiento”



Use la velocidad  
de la TDF

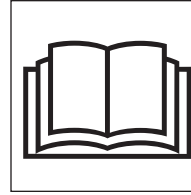


# Preparación para una operación segura

## Enganche de la cortadora de césped al tractor

### Cortadoras montadas en enganche de tres puntos:

- Consulte los manuales de los fabricantes de la cortadora y del tractor.
- Coloque la palanca selectora de elevación de potencia hidráulica del tractor en la posición descendida para evitar movimientos imprevistos.
- Explique los procedimientos de enganche a los operadores que no puedan leerlos.
- Pueden requerirse pesos en el extremo delantero para mantener el control de la dirección y la estabilidad del extremo delantero. Consulte los manuales del operador de los fabricantes.
- Al hacer retroceder el tractor hasta la cortadora de césped, NUNCA permita que haya personas entre tractor y la cortadora.
- Instale la cortadora en los eslabones de tres puntos del tractor y asegúrela en su lugar con pasadores.
- Instale con seguridad la línea motriz a la TDF del tractor. Descienda el escudo principal hasta su lugar si es móvil. Empuje y tire de la línea motriz para asegurarse de que esté trabada en el vástago de la TDF.



Lea y asegúrese de comprender los manuales antes de comenzar la operación



Mantenga una distribución correcta del peso



No permita que haya nadie entre el tractor y la cortadora de césped

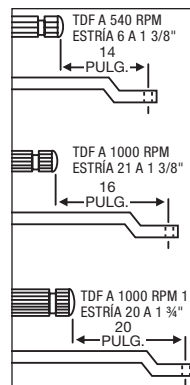


Evite quedar enredado, use guardas y escudos

# Preparación para una operación segura

### Cortadoras montadas en enganche tipo de tiro:

- Consulte los manuales de los fabricantes de la cortadora y del tractor.
- Retire el acople rápido del enganche de tres puntos si está instalado.
- Instálelo únicamente al enganche de la barra de tiro.
- Ajuste la longitud de la barra de tiro del tractor para el funcionamiento de la TDF a 540 ó 1000 rpm.
- Al hacer retroceder el tractor hasta la cortadora de césped, NUNCA permita que haya personas entre tractor y la cortadora.
- Instale correctamente la cadena de remolque de seguridad de la cortadora en el tractor.
- Instale con seguridad la línea motriz a la TDF del tractor. Empuje y tire de la línea motriz para asegurarse de que esté trabada en la TDF. Descienda el escudo principal a su lugar.
- Conecte las mangueras hidráulicas de la cortadora de césped en el tractor.
- Asegúrese de que los laterales o las plataformas elevadas de la cortadora estén sostenidas por los cilindros antes de retirar las trabas de transporte. Nunca haga fuerza para soltar las trabas de transporte o de los laterales. Los laterales o la plataforma podrían caerse y aplastarlo.



Ajuste de la barra de tiro del tractor



Confirme que los laterales estén apoyados antes de soltar las trabas



Evite quedar enredado, use guardas y escudos

# Arranque con seguridad

## Cómo realizar un arranque correcto

Corte la hierba únicamente con luz diurna o en condiciones de buena luz artificial.

Evite lesiones graves o muerte producidas por objetos arrojados por la cortadora o por el contacto con las hojas:

- Mantenga los escudos de las cadenas, los escudos deflectores flexibles o sólidos y las rampas de descarga en su lugar y en buen estado de reparación.
- Mantenga a las personas ajenas a 300 pies (92 m) de la operación de corte.
- Nunca dirija la descarga de la cortadora hacia una persona.
- Mantenga las manos, los pies y otras partes del cuerpo alejadas de las piezas giratorias, las hojas y las aberturas de descarga.
- No haga funcionar la cortadora de césped en la posición de transporte.

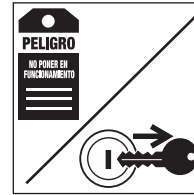
No se acerque a una cortadora hasta que todo movimiento se haya detenido.

Enganche de la transmisión de RDF de la cortadora de césped:

- Eleve la cortadora hasta la altura de corte máxima.
- Enganche la TDF a baja velocidad del motor.
- Aumente la velocidad del motor hasta llegar a la velocidad nominal de la TDF.
- Descienda la cortadora hasta la altura de corte deseada.
- Detenga y apague de inmediato si la cortadora golpea contra una obstrucción.
- Inspeccione y repare cualquier daño de la cortadora antes de reanudar el corte.
- No haga funcionar una cortadora que vibra en exceso o produce ruidos anormales.



**Hojas giratorias – Manténgase**



**No ponga en funcionamiento una cortadora de césped dañada**

## Objetos arrojados por la cortadora de césped

Dependiendo del propósito previsto, las cortadoras están diseñadas para cortar hierba, maleza, broza y cultivos. Las hojas de la cortadora están diseñadas y probadas para uso intensivo. Las hojas de la cortadora, sin embargo, no están diseñadas para entrar en contacto con objetos sólidos como rocas, cemento o metales. Un impacto de este tipo puede arrojar objetos rotos hasta 300 pies (92 m) de distancia. Nunca debe haber personas ajenas a menos de 300 pies (92 m) de una cortadora giratoria en funcionamiento o a menos de 100 pies (30 m) de una cortadora de disco correctamente equipada.

# Operación con seguridad

Los escudos de la cortadora están diseñados para reducir el riesgo de objetos arrojados y se deben mantener correctamente y en su lugar durante las operaciones de corte.

El riesgo de lesiones graves o muerte puede reducirse significativamente si se siguen estas reglas. **Si no se siguen todas estas reglas de seguridad, la operación de corte debe detenerse en caso de que alguna persona ingrese dentro del límite de seguridad correspondiente a cada tipo de cortadora.**

**Primero** — Inspeccione la zona antes de cortar y retire las piedras, ramas, alambres, cables, metales, vidrios y otros objetos sólidos antes de hacer funcionar la máquina. Los objetos que no puedan retirarse deben marcarse con claridad y ser evitados con cuidado por el operador.

En áreas sin cultivos con hierba y maleza de altura suficiente como para ocultar objetos que podrían ser golpeados por las hojas, inspeccione la zona y retire o marque los residuos u obstáculos grandes.



**Siga todas las reglas de seguridad**

Realice el corte de la zona a una altura intermedia. Inspeccione la zona atentamente y retire o marque cualquier residuo u obstáculo restante. Corte nuevamente a la altura final deseada.

**Segundo** — Los escudos para objetos arrojados por la cortadora deben usarse cuando se opera cerca de caminos, parques, zonas pobladas u otras zonas donde objetos arrojados podrían lesionar a personas ajenas o dañar la propiedad. Siga el manual del operador del fabricante.

**Tercero** — Cruce en sentido diagonal cuando realiza el corte a través de zanjas, depresiones marcadas y hundimientos. Eleve la cortadora para evitar que las hojas de la cortadora golpeen el suelo.

# Operación con seguridad

## Objetos arrojados por la cortadora de césped (continuación)

**Cortadoras de disco** — Cuando se usa una cortadora de disco, es importante conocer la zona donde se va a cortar. Si el operador ha realizado cortes en el terreno antes y está familiarizado con todos los obstáculos que puede haber, es suficiente observar delante de la trayectoria de la cortadora para detectar cualquier objeto adicional que pueda haber ingresado en el terreno. Está preparado para detenerse o evitar objetos que podrían ser peligrosos si son arrojados por la cortadora. Si piensa cortar en un terreno que no conoce bien y se encuentra junto a un camino transitado o puede haber personas a menos de 100 pies (30 m) de la cortadora de césped, debe inspeccionar y limpiar o marcar el terreno.

### Cómo cortar en retroceso

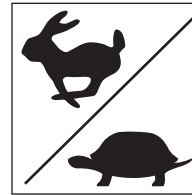
No corte mientras se desplaza en retroceso. Es más probable que se arrojen objetos y que éstos puedan llegar más lejos.



No corte en retroceso

Apague la TDF, espere que las hojas dejen de girar, eleve la cortadora y, después, retroceda.

Corte desplazándose en sentido de avance.



Use la velocidad de desplazamiento correcta

### Velocidad de desplazamiento durante el corte

La velocidad de desplazamiento correcta depende de las condiciones del terreno y del tipo de hierba, la densidad y la altura que debe cortarse:

- El rango normal de velocidad de desplazamiento es de 2 a 5 mph (3.2 a 8 km/h).
- Use una velocidad de desplazamiento menor para cortar hierbas altas y densas.
- Use una velocidad de desplazamiento mayor para cortar hierba delgada a altura media y con condiciones de terreno sin dificultades.
- Use una velocidad de desplazamiento menor para acortar en terreno irregular, con pendientes o no muy conocido.

Las cortadoras de disco están diseñadas para usar velocidades de desplazamiento mayores cuando funcionan en terrenos despejados de residuos y peligros superficiales.

# Operación con seguridad

## Corte de hierba extremadamente alta

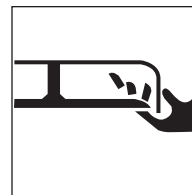
Puede ser necesario cortar dos veces la hierba extremadamente alta que no sea cultivo. (Consulte la página 13, **Objetos arrojados por la cortadora de césped.**)

Primera pasada de corte:

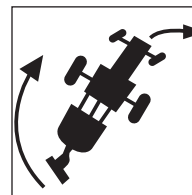
- Apague la cortadora y el tractor usando la práctica correcta de apagado de equipos antes de descender del tractor. (Consulte la página 18, **Prácticas correctas de apagado de los equipos.**)
- Inspeccione la zona y retire o marque cualquier residuo u obstáculo.
- Corte la hierba a mayor altura (10 a 15 pulg. [25 a 38 cm]) para evitar los objetos ocultos.

Segunda pasada de corte:

- Apague la cortadora y el tractor usando la práctica correcta de apagado de equipos antes de descender del tractor.
- Inspeccione la zona y retire o marque cualquier residuo u obstáculo.
- Corte la hierba a la altura deseada y, de ser posible, a 90 grados con respecto a la primera pasada de corte.



Detenga la hoja antes de desatascar



Proporcione el espacio libre adecuado para la oscilación de la cortadora de césped

### Preste atención a los espacios libres de los equipos

Las cortadoras con enganche de tres puntos y montaje lateral tienen un arco de giro mayor que las tipo de tiro. Deje el espacio libre suficiente para la oscilación de la cortadora cuando gira.

No permita que haya personas ajenas cerca del tractor y la cortadora de césped cuando mueve o transporta el tractor y la cortadora.



# Operación con seguridad

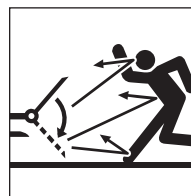
## Prácticas de seguridad para la cortadora de césped de montaje inferior

Cuando se traslada con una cortadora de césped de montaje inferior:

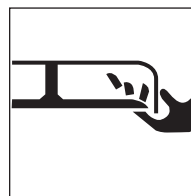
- Mantenga la rampa de descarga extraíble en su lugar y por encima de la abertura de descarga.
- Nunca se pare sobre la carcasa de una cortadora de césped cuando el motor del tractor está en funcionamiento.
- Distribuya los recortes de hierba con la rampa de descarga orientada hacia la zona donde se cortó.
- Antes de limpiar una cortadora o una rampa de descarga atascada, apague la máquina usando la práctica correcta para apagado del equipo. (Consulte la página 18, **Prácticas correctas de apagado de los equipos.**)



Nunca se pare sobre la cortadora de césped – Manténgase alejado



Mantenga la rampa en su lugar



Detenga la hoja antes de desatascar

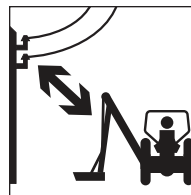
# Operación con seguridad

## Cortadora de césped con lateral o aguilón Peligros y riesgos de obstrucciones elevadas

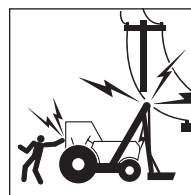
Verifique en busca de obstrucciones elevadas con las cortadoras que tienen el lateral o el aguilón elevado, para evitar lesiones graves o la muerte por contacto con:

- Líneas y aparatos eléctricos.
- Ramas bajas de los árboles.
- Otras obstrucciones elevadas.
- Mantenga las distancias especificadas con respecto a los cables y los aparatos eléctricos. Nunca se acerque a cables o aparatos eléctricos energizados con ninguna parte de la máquina, salvo que se hayan tomado todas las precauciones de seguridad locales, estatales/provinciales y federales (OSHA) necesarias. Use extrema precaución.

**¡PELIGRO!** Evite la electrocución o lesiones graves por contacto o un espacio libre inadecuado con respecto a líneas o aparatos eléctricos energizados. **No permita que la máquina o el accesorio se acerque o entre en contacto con una línea de electricidad. No se acerque ni toque una máquina que esté en contacto con una línea de electricidad.**



No se acerque a líneas de electricidad energizadas



Manténgase alejado de los equipos energizados

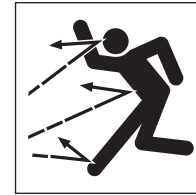
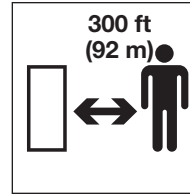
# Operación con seguridad

## Prácticas de seguridad para cortadoras de césped con laterales y montaje lateral

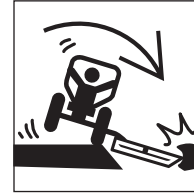
Las posiciones elevadas de los laterales reducen la protección de los escudos y aumentan los riesgos de objetos arrojados y contacto con las hojas.

**Evite la posibilidad de lesiones graves o muerte por objetos arrojados o contacto con las hojas causados por la elevación y el descenso de los laterales durante las operaciones de corte:**

- No realice cortes con personas ajenas presentes a menos de 300 pies (92 m) de la cortadora de césped.
- Asegúrese de que no haya personas cerca de la cortadora mientras se elevan o descienden los laterales.
- Apague la TDF y espere hasta que todos los elementos giratorios se hayan detenido antes de elevar la plataforma o la sección lateral de la cortadora.
- Únicamente eleve el lateral para quitar objetos de la trayectoria de corte o para acompañar una pendiente del terreno.
- Descienda hasta el suelo el lateral elevado una vez que se eliminó el objeto o se superó la pendiente.
- Detenga el trabajo de corte si alguna persona se acerca a menos de 300 pies (92 m) de la zona de corte.



**Mantenga a las personas ajenas alejadas de la zona de corte**



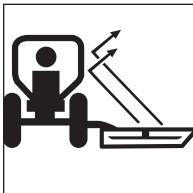
**Evite golpear obstrucciones**

## Prácticas de seguridad para trabajos de corte en orillas de zanjas

Use extremo cuidado al realizar cortes en orillas de zanjas. Preste atención a escurrimientos, zonas erosionadas y obstrucciones para el corte a lo largo de las orillas de zanjas. Si se golpean obstrucciones con cortadoras de montaje lateral o con aguilón, el extremo delantero del tractor puede desviarse hacia la zanja.

# Operación con seguridad

Los trabajos en orillas de zanjas con aguilón y lateral elevado pueden reducir la eficacia de la protección del operador de la cortadora que proporcionan los escudos para objetos arrojados.



**Utilice cabinas cerradas con ROPS o cerramientos de protección**

- Cuando realice estas operaciones, use cabinas cerradas con ROPS, cerramientos protectores especiales y otros escudos para el operador que ofrece el fabricante.
- Inspeccione la zona de corte y retire o marque todos los objetos extraños y los residuos que deberá esquivar la cortadora.

## Prácticas de seguridad para trabajos de corte en terrenos desparejos

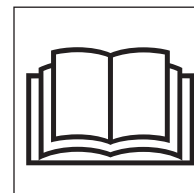
Las pendientes y los terrenos desparejos reducen la estabilidad del tractor y de la cortadora.

Como en todas las condiciones de corte, use tractores equipados con ROPS y cinturón de seguridad. **Asegúrese**

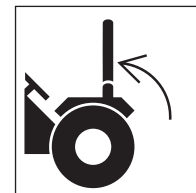
**de que el ROPS está elevado y trabado en su lugar y use siempre el cinturón de seguridad.**

Prevenga los vuelcos del tractor y de la cortadora de césped y mantenga controlada la estabilidad de los equipos:

- Repase los manuales del operador del tractor y de la cortadora para ver las prácticas de seguridad para operaciones en pendientes y terrenos desparejos. Explique las prácticas a los operadores que no puedan leerlas.
- Evite trabajar en pendientes extremadamente empinadas.



**Lea y asegúrese de comprender los manuales antes de comenzar la operación**

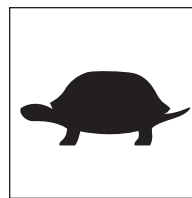


**Use el ROPS y el cinturón de seguridad**

# Operación con seguridad

## Prácticas de seguridad para trabajos de corte en terrenos desparejos (continuación)

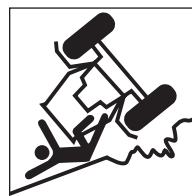
- Use extremo cuidado para mantener el control de los equipos cuando trabaja en estas condiciones.
- Aumente la estabilidad del tractor agregando pesos o lastre en las ruedas y aumentando al máximo la separación entre las ruedas. Consulte las recomendaciones en el manual del operador.
- Mantenga la velocidad de desplazamiento en el mínimo.
- Realice giros amplios y graduales.
- Evite los arranques, las paradas y los giros bruscos cuando trabaje en subidas o bajadas de pendientes o sobre ellas.
- **No** levante del suelo las cortadoras de montaje trasero o de montaje lateral ni los laterales de la cortadora durante estas operaciones.
- Manténganse alerta en busca de agujeros, baches, pozos, tocones u otras obstrucciones que podrían hacer volcar la máquina.
- Evite las condiciones de suelo resbaladizo que podrían causar la pérdida de control y el vuelco del tractor y la cortadora.
- Evite bajar completamente y golpear el suelo cuando cruza en sentido diagonal depresiones marcadas y hundimientos.



Mantenga el control, desplácese



Agregue lastre, ensanche la separación entre las ruedas



Evite los pozos, baches y agujeros

Use extremo cuidado al mantener la estabilidad de los equipos durante todos los trabajos de corte en terrenos desparejos y pendientes. Usted es quien juzga en última instancia si en cualquier pendiente se puede trabajar con seguridad.

# Operación con seguridad

## Prácticas de seguridad para el transporte en caminos

Antes de operar en la vía pública:

- Consulte los manuales del operador de los fabricantes de la cortadora y del tractor para ver instrucciones.
- Explique las instrucciones a los usuarios u operadores que no puedan leerlas.
- Verifique las ordenanzas locales sobre marcas, luces, balizas, etc. requeridas en los equipos durante el desplazamiento por la vía pública. Se requieren luces en las cortadoras que obstaculizan la visibilidad de las luces traseras y/o las luces de advertencia del tractor.
- Cuando transporte la cortadora de césped en un remolque, siga las instrucciones detalladas del fabricante para la carga, el amarre y la descarga de la cortadora.

Antes de transportar en la vía pública:

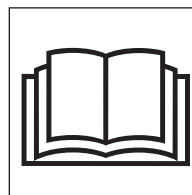
- Desconecte la alimentación de la TDF a la cortadora.
- Eleve la cortadora a la posición de transporte y aplique la traba para transporte.
- Trabe los laterales de la cortadora de césped en la posición de transporte con dispositivos de bloqueo aprobados.
- Instale una cadena de seguridad para remolque entre la cortadora tipo de tiro y el tractor.
- Asegúrese de que las luces, las luces de advertencia y los reflectores están en su lugar y son visibles.

- Verifique que el emblema de vehículo de movimiento le resulte visible a cualquier vehículo que se aproxime por atrás.

Durante el transporte en la vía pública:

- Obedezca todas las ordenanzas de tránsito locales.
- Acérquese a las intersecciones con precaución.
- Observe los letreros de velocidad y control del tránsito.
- Evite las paradas de emergencia y los giros cerrados.

Sea un operador amable y apártese periódicamente para dejar pasar el tránsito.



Lea y asegúrese de comprender los manuales antes de comenzar la operación



Obedezca las ordenanzas de tránsito

# Estacionamiento seguro

## Prácticas de seguridad para el estacionamiento

- Use las zonas designadas o alejadas del tránsito.
- Use lugares con suelo firme y nivelado.
- Aplique el freno de estacionamiento.
- Descienda el equipo de la cortadora de césped hasta el suelo.

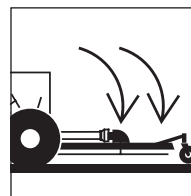
Apague la cortadora y el tractor usando la práctica correcta de apagado de equipos antes de descender del tractor. (Consulte la página 18, **Prácticas correctas de apagado de los equipos.**)

Lugares de estacionamiento con suelo en pendiente:

- Ubique los equipos transversalmente con respecto a la pendiente.
- Aplique los frenos de estacionamiento.
- Descienda el equipo de la cortadora de césped hasta el suelo.
- Bloquee las ruedas del tractor.



**Aplique el freno de estacionamiento**



**Descienda los equipos elevados hasta el suelo**

Antes de estacionar temporalmente y dejar equipos deshabilitados cerca de zonas con tránsito:

- Retire los equipos de la vía pública.
- Instale banderas de advertencia.
- Use las balizas de advertencia del tractor.

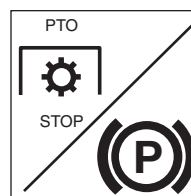
# Apagado con seguridad

## Prácticas correctas de apagado de los equipos

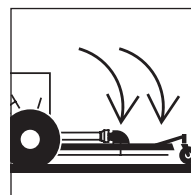
Transforme el apagado correcto de los equipos en un hábito.

El apagado correcto de un tractor y una cortadora de césped puede ayudar a evitar accidentes cuando la cortadora está sin vigilancia. Apague la cortadora siguiendo los procedimientos específicos del manual del operador del fabricante. Estos procedimientos normalmente incluirán:

- Reduzca la velocidad del motor.
- Desenganche el embrague de la TDF y la transmisión.
- Haga funcionar el motor en ralentí para que se enfríe gradualmente.
- Coloque todos los controles en la posición de estacionamiento.
- Aplique el freno de estacionamiento.
- Descienda la cortadora de césped hasta el suelo.
- Descienda los laterales de las cortadoras con laterales hasta el suelo.
- Apague el motor, trabe la ignición y retire la llave de la máquina; llévela con usted.
- Espere hasta que todas las piezas móviles se hayan detenido antes de descender.
- Libere la presión hidráulica moviendo los controles hidráulicos varias veces en todas las direcciones.
- Trabe las cubiertas y los cerramientos antivandalismo, si están instalados, cuando los equipos están sin vigilancia.
- Descienda con cuidado manteniendo contacto de tres puntos.



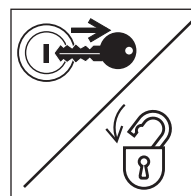
**Desenganche la TDF, aplique el freno**



**Descienda los equipos elevados hasta el suelo**



**Espere hasta que las piezas giratorias se detengan**



**Retire la llave, trabe la ignición, llévese la llave**

# Apagado con seguridad

## Descenso correcto

- Nunca descienda de equipos en movimiento.
- Nunca baje de una máquina saltando.
- Descienda con cuidado.
- Verifique que no haya peldaños resbaladizos.
- Mantenga los pies y las manos lejos de los controles.
- Use los asideros y los peldaños durante el descenso.
- Enfrente la máquina y use contacto de tres puntos (2 manos y 1 pie o 2 pies y 1 mano).



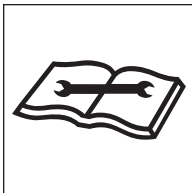
Espere hasta que las piezas móviles se detengan



Use contacto de tres puntos; enfrente a la máquina

# Realización de mantenimiento con seguridad

## Mantenimiento de los equipos



Realice el mantenimiento de los equipos

Asegúrese de mantener los equipos de acuerdo con las instrucciones del fabricante. Verifique con regularidad el funcionamiento de los dispositivos de protección y de seguridad.

**No** realice ningún trabajo en un tractor o en una cortadora de césped si no está autorizado y cualificado para hacerlo.

Si ha sido autorizado para realizar mantenimiento, **lea los manuales del operador y de servicios**. Estudie las instrucciones; verifique las tablas de lubricación; examine todos los mensajes de instrucciones que haya sobre la máquina. El mantenimiento puede ser peligroso si no se realiza correctamente. Asegúrese de tener las habilidades necesarias, la información y las herramientas y equipos correctos para realizar el trabajo.

**¡ADVERTENCIA!** No modifique equipos ni agregue componentes no aprobados por el fabricante. Use piezas, lubricantes y técnicas de servicio recomendadas por el fabricante.

## Piezas de la cortadora de césped y seguridad personal

Los fabricantes de cortadoras de césped usan sujetadores y específicos y piezas especialmente diseñadas para cumplir con los requisitos de las operaciones de las cortadoras. Las piezas críticas (pernos autobloqueantes de las hojas, hojas, pasadores, escudos y otros componentes especiales) tienen requisitos específicos de resistencia, diseño y ajuste para la marca y el modelo de cortadora que usted está usando.

Evite posibles lesiones graves o la muerte por el uso de piezas o modificaciones no aprobadas:

- No sustituya con tornillería común los pernos de las hojas u otros componentes de piezas especiales originales del fabricante.
- No sustituya hojas, pasadores, escudos u otras piezas críticas.
- No use pernos de mayor resistencia para reemplazar los pernos de seguridad originales del fabricante.

# Realización de mantenimiento con seguridad

## Preparación personal

Use la ropa de protección personal y los equipos de protección personal (PPE) que se le proporcionen o que requieran las condiciones del trabajo. **SIEMPRE** debe usar gafas de seguridad con escudos laterales.

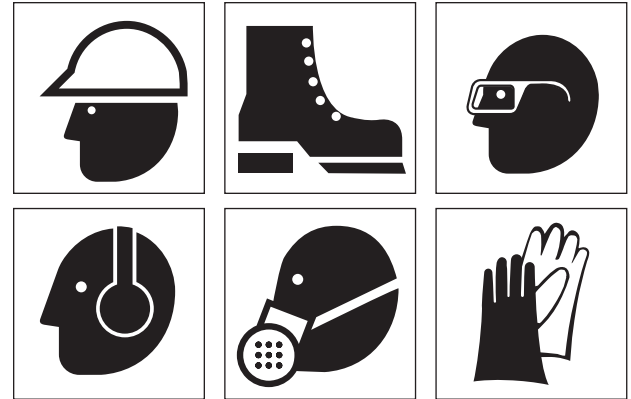
Puede necesitar también:

- Casco
- Calzado de seguridad
- Anteojos de seguridad, antiparras o protección facial
- Delantal y guantes
- Protección para oídos
- Casco o antiparras para soldar
- Respirador o máscara con filtro

Use la ropa necesaria; no corra ningún riesgo.

**Mantenga las manos (y la ropa) alejadas de todas las piezas móviles.** No use cordones sueltos, mangas flojas, anillos, relojes o cabello largo.

**¡ADVERTENCIA!** Evite lesiones graves o muerte por enredos. **No use ropa floja ni accesorios. Manténgase alejado de todos los componentes giratorios cuando el motor está en funcionamiento.** El contacto, el enrollado o el enredo con piezas giratorias o móviles podrían resultar en lesiones graves o la muerte.



Evite las piezas giratorias



Evite puntos donde pueda quedar atrapado

# Realización de mantenimiento con seguridad

Use un delantal de caucho y guantes de caucho cuando trabaja con sustancias corrosivas. Use guantes y calzado de seguridad cuando manipula bloques de madera o metales con bordes agudos.

Use siempre anteojos de seguridad, antiparras o protección facial. Proporcionan protección ocular para fluidos bajo presión, mientras se esmerila y se realizan servicios a las baterías. También es necesaria protección contra residuos, líquidos y material suelto producido por el equipo, las herramientas y el aire/agua presurizada.

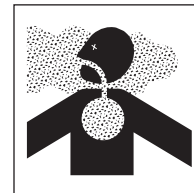
Use protección facial y siga las instrucciones del fabricante cuando desarma componentes cargados a resorte o cuando trabaja con ácidos de batería. Use un casco o antiparras para soldar con filtro esfumado cuando suelda o corta con soplete.

No arene, esmerile, corte con soplete o suelde sin un respirador aprobado por NIOSH o una ventilación adecuada. Si se requiere soldar en esta máquina, consulte los manuales del operador o de servicios del fabricante o consulte al concesionario de los equipos para obtener los procedimientos correctos.

Mantenga los bolsillos sin objetos que podrían salirse y caer dentro de la maquinaria.



Limpie las superficies resbaladizas



Ventile la zona de trabajo

Maneje las herramientas y las piezas pesadas con sensatez con respecto a usted mismo y a otras personas. Deposite los elementos, no los deje caer.

## Preparación de la zona de trabajo

- Ubique la cortadora de césped en una zona nivelada fuera del paso de otros equipos en funcionamiento.
- Asegúrese de que haya luz, ventilación y espacio libre adecuados.
- Quite el aceite, la grasa o el agua para eliminar toda superficie resbaladiza.
- Limpie alrededor de la zona donde se realizarán servicios para minimizar la contaminación.



# Realización de mantenimiento con seguridad

## Preparación de la máquina

Deben controlarse o reducirse las fuentes de energía almacenada (eléctricas, mecánicas, hidráulicas, neumáticas, químicas, térmicas, etc.) al mínimo practicable antes de realizar cualquier procedimiento de mantenimiento, reparación o servicio.

### Prácticas de seguridad para prevenir posibles lesiones por fuentes que liberan energía:

- Desenganche la TDF antes de apagar el motor.
- Coloque los controles en la posición de estacionamiento o punto muerto antes de apagar el motor.
- Aplique el freno de estacionamiento o bloquee las ruedas.
- Espere hasta que todas las piezas móviles se detengan.
- Descienda la cortadora de césped hasta el suelo.
- Descienda los laterales de las cortadoras con laterales hasta el suelo.
- Apague el motor del tractor.
- Libere la presión del sistema hidráulico moviendo los controles varias veces en todas las direcciones.
- Trabe la ignición, retire la llave y llévesela.



Prepare los sistemas de la máquina para realizarles servicios

- Escuche y observe en busca de evidencias que indiquen piezas en movimiento antes de descender.
- Apoye o bloquee con seguridad la cortadora de césped antes de trabajar debajo de ella o de otros componentes elevados.
- Apoye, bloquee o trabe con seguridad los laterales de la cortadora con dispositivos de traba aprobados antes de trabajar cerca o debajo de una cortadora con laterales.
- Alivie la presión antes de desconectar o desarmar un sistema presurizado.
- Bloquee o alivie la presión de los resortes antes de desarmar un mecanismo cargado a resorte.
- Apoye o bloquee con seguridad cualquier componente elevado de la máquina antes de trabajar en él.
- Evite las llamas, las chispas y no fume cerca de combustibles, fluido hidráulico u otro material inflamable como los residuos de los cortes.

# Realización de mantenimiento con seguridad

Fije una etiqueta con la advertencia “NO PONER EN FUNCIONAMIENTO” en todas las palancas de control y retire la llave de contacto si la cortadora de césped no debe ser utilizada. Llévese la llave.

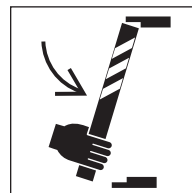
Instale dispositivos de apoyo aprobados cuando trabaje debajo o cerca de equipos elevados.

**¡ADVERTENCIA!** Las cortadoras de césped u otros equipos elevados no apoyados pueden caerse de manera imprevista. **Nunca se introduzca debajo de equipos elevados si no están apoyados en dispositivos de apoyo aprobados.** La caída de equipos podría resultar en una lesión grave o la muerte por aplastamiento.

Retire sólo las guardas o cubiertas que permiten acceder a la zona donde se realizarán servicios. Vuelva a colocar todas las guardas y cubiertas cuando el trabajo esté terminado.



Use una “etiqueta que indique No poner en funcionamiento”



Utilice dispositivos de apoyo aprobados



Vuelva a colocar todas las guardas

# Realización de mantenimiento con seguridad

## Use ventilación adecuada

Si es necesario hacer funcionar un motor en una zona cerrada, elimine del área las emanaciones de escape con una extensión del caño de escape. Si no tiene esa extensión, asegúrese de abrir las puertas y dejar entrar aire del exterior.

**¡ADVERTENCIA!** Evite posibles lesiones. **Nunca trabaje en la maquinaria con el motor en funcionamiento salvo que así lo indiquen los manuales del fabricante para un servicio en particular.**

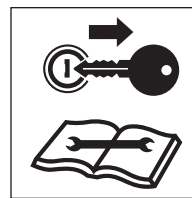
**¡ADVERTENCIA!** Nunca haga funcionar ningún tipo de motor sin la ventilación adecuada: LAS EMANACIONES DEL ESCAPE PUEDEN SER MORTALES.

## Use gatos y malacates con cuidado

Los soportes o bloques de seguridad deben ubicarse en una parte rígida de la cortadora. No ubique soportes debajo de ejes o apoyos de ruedas que puedan girar.

Si debe trabajar debajo de equipos elevados, siempre use bloques de madera (**no de concreto**), soportes de gato u otros soportes rígidos y estables. Cuando use gatos o malacates, siempre asegúrese de que están correctamente apoyados.

**¡ADVERTENCIA!** Evite posibles lesiones por aplastamiento. **Nunca use bloques de concreto para apoyo.** Pueden colapsar bajo cargas incluso livianas.



Retire la llave y lea el manual de mantenimiento



Ventile la zona de trabajo



Use un apoyo adecuado para los equipos elevados

Asegúrese de que los malacates o gatos que usa estén en buenas condiciones. Nunca use gatos con piezas rajadas, dobladas o retorcidas. Nunca use cables pelados, retorcidos o pellizcados. Nunca use ganchos doblados o deformados.

# Realización de mantenimiento con seguridad

## Prácticas de seguridad para tareas de mantenimiento comunes

### Riesgos del combustible

**¡ADVERTENCIA!** Siempre use recipientes y/o equipos de distribución de combustible aprobados.

Los combustibles son inflamables; por eso, debe cumplir estas prácticas con el fin de reducir la posibilidad de un accidente grave.

- Apague el motor y la ignición mientras carga combustible.
- Siempre conecte a tierra la boquilla de combustible contra el cuello de llenado del depósito para evitar chispas.
- Mantenga las chispas y llamas abiertas alejadas del combustible.
- No fume mientras carga combustible o manipula recipientes con combustible.
- No corte ni suelde en líneas, tanques o recipientes de combustible ni cerca de ellos.
- No llene el depósito en exceso o derrame combustible. Limpie el combustible derramado de inmediato.

### Riesgos del refrigerante de motor

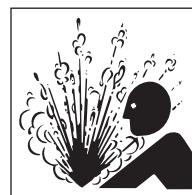
Los sistemas de refrigeración con líquidos acumulan presión a medida que el motor se calienta; **tenga suma precaución antes** de retirar la tapa del radiador.

Asegúrese de:

- Detener el motor y esperar que el sistema se enfríe.
- Usar ropa de protección y anteojos de seguridad.
- Girar la tapa del radiador lentamente hasta el primer tope para permitir que la presión escape antes de retirar la tapa por completo.



No fumar; evitar las llamas abiertas



Retire la tapa del radiador lentamente



# Realización de mantenimiento con seguridad

## Riesgos del sistema hidráulico

El sistema hidráulico se encuentra bajo presión siempre que el motor está funcionando; puede conservar presión incluso después de apagar el motor. Haga funcionar todos los controles hidráulicos incluyendo el control hidráulico auxiliar después de que el motor esté apagado. Alivie la presión atrapada en las líneas después de que los accesorios están apagados y apoyados en el suelo.

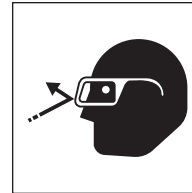
Durante la inspección del sistema hidráulico:

- Espere que el fluido se enfríe antes de desconectar las líneas. El fluido hidráulico caliente puede causar QUEMADURAS GRAVES.
- **No** use las manos para verificar la presencia de fugas. En cambio, use un cartón o papel para buscar fugas.
- Use protección ocular adecuada. El fluido hidráulico puede causar lesiones oculares permanentes.

**¡ADVERTENCIA!** El fluido hidráulico bajo presión pueden penetrar la piel o los ojos y causar lesiones graves, ceguera o la muerte. Las fugas de fluido bajo presión pueden no ser visibles. **Utilice un cartón o una madera para buscar fugas, no la mano. Use una protección facial o antiparras de seguridad para proteger los ojos.** Si el fluido se inyecta en la piel, debe ser extraído dentro de las próximas pocas horas por personal médico familiarizado con este tipo de lesión.

Cuando ventila o llena el sistema hidráulico, afloje la tapa de llenado con lentitud y retírela gradualmente.

**Nunca** restablezca una válvula de alivio del sistema hidráulico a una presión mayor que la recomendada por el fabricante.



Use protección ocular



El fluido a alta presión puede inyectarse en el cuerpo

# Realización de mantenimiento con seguridad

## Riesgos del sistema eléctrico

Antes de trabajar en el sistema eléctrico, desconecte los cables de la batería.

- Retire primero los cables negativos (-) de la batería.
- Al reconectar la batería, conecte los cables negativos (-) de la batería al final.

El líquido del interior de las baterías contiene ácido, que es un VENENO y puede causar QUEMADURAS QUÍMICAS GRAVES.

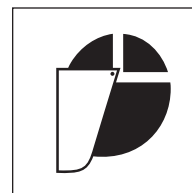
## Evite lesiones

- Use una protección facial para evitar el contacto con los ojos.
- Use guantes y ropa resistentes a los productos químicos para mantener al electrolito alejado de la piel y la ropa común.

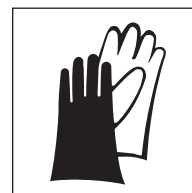
**¡ADVERTENCIA!** El contacto con el electrolito daña los ojos y la piel. **Siempre use una protección facial para evitar que el electrolito penetre en los ojos.** Si el electrolito entra en contacto con los ojos, enjuague de inmediato con agua limpia y busque atención médica.

**Use guantes de caucho y ropa de protección para mantener el electrolito lejos de la piel.** Si el electrolito entra en contacto con la piel o la ropa, lave de inmediato con agua limpia.

**Si se ingiere,** busque atención médica de inmediato. **NUNCA** proporcione líquidos que induzcan el vómito.



Use protección facial



Use indumentaria de protección

# Realización de mantenimiento con seguridad

## Evite explosiones

**¡ADVERTENCIA!** Evite posibles lesiones graves por explosiones. Las baterías de plomo-ácido producen gases sumamente explosivos, especialmente durante la carga. **Mantenga alejados los arcos, las chispas, las llamas y el tabaco encendido.**

- **No** fume cerca de las baterías.
- Mantenga los arcos, las chispas y llamas abiertas alejadas de las baterías.
- Proporcione ventilación adecuada.

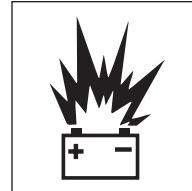
**Nunca** revise la batería colocando un objeto metálico entre los bornes: la chispa resultante podría causar una explosión.

**¡ADVERTENCIA!** Evite posibles lesiones graves por explosiones de baterías. **No cargue baterías ni arranque con refuerzo el motor si la batería está congelada.** Caliente a 60 °F (15,5 °C) o la batería puede explotar y causar lesiones graves.

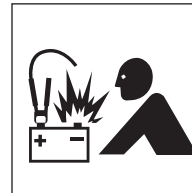
Reglas de seguridad durante el arranque con refuerzo de batería:

- Siga las instrucciones para el “arranque con refuerzo de batería” correcto como se especifica en el manual del fabricante.

- Asegúrese de que las máquinas no se estén tocando.
- Observe la polaridad de las baterías y conexiones.
- Realice la conexión final de cable al motor o al punto de tierra más alejado de la batería. Nunca realice la conexión final en el arrancador o la batería muerta: las chispas pueden encender gases explosivos presentes en la batería.
- Cuando desconecta cables después de un arranque con puente, retire los cables en el orden inverso al de la conexión (es decir, la conexión final primero).



Evite las chispas y las llamas abiertas cerca de las baterías



Para el arranque con refuerzo, observe la polaridad y realice la conexión final en el punto de descarga a tierra

# Realización de mantenimiento con seguridad

## Mantenimiento de neumáticos y ruedas

Revise los neumáticos y las ruedas a diario porque la estabilidad del tractor y la cortadora de césped puede verse significativamente afectada por la presión de los neumáticos o daños en los neumáticos o en las ruedas.

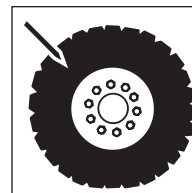
Revise los neumáticos para verificar:

- La presión correcta.
- Cortes y protuberancias.
- Clavos u otras pinchaduras.
- Desgaste desigual o excesivo.
- Estado de los vástagos y tapas de las válvulas.

Revise las ruedas para verificar:

- Daños en las llantas.
- Tuercas o pernos faltantes o flojos.
- Desalineación.

Todos los servicios de neumáticos deben ser realizados por un centro de servicios para neumáticos cualificado o por una persona de servicio autorizada debidamente capacitada en los procedimientos y el uso del equipo de seguridad destinado a los servicios de neumáticos.



Revise los neumáticos y las ruedas en busca de daños



Mantenga la presión correcta en los neumáticos

# Realización de mantenimiento con seguridad

## Mantenimiento de neumáticos y ruedas (continuación)

**¡ADVERTENCIA!** Los tipos de ruedas y neumáticos que generalmente se encuentran en estos equipos requieren cuidados especiales al realizar servicios para evitar lesiones graves o la muerte.

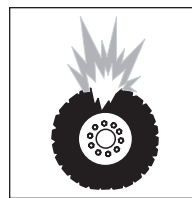
No infle los neumáticos por encima de la presión recomendada. Asegúrese de volver a colocar el lastre de los neumáticos si está instalado. Consulte las especificaciones del fabricante para ver los requisitos de lastre.

Mantenga las tuercas de las ruedas apretadas según las recomendaciones del fabricante.

Es normal que la presión de los neumáticos aumente durante el funcionamiento; NO se debe reducir.

Nunca vuelva a inflar un neumático que se ha desinflado mucho o por completo sin retirar el neumático de la rueda. Haga inspeccionar atentamente el neumático y la rueda para detectar daños antes de volverlos a armar.

Al agregar aire a un neumático, hágalo desde cierta distancia. Use una manguera larga con mandril de autofijación. Siempre párese detrás de la trocha cuando ajusta la presión de un neumático.



**Evite la explosión de los neumáticos**

No infle neumáticos con gases inflamables o con sistemas que usan un inyector de alcohol.

Nunca corte o suelde una rueda con un neumático inflado instalado en ella. Esto podría causar descompresión explosiva.

Verifique que el tamaño del neumático y la rueda coincidan correctamente.

Cuando reemplaza neumáticos, asegúrese de que sean de la clasificación adecuada especificada por el fabricante.

Los neumáticos no deben funcionar a velocidades más altas que las nominales. La mayoría de los neumáticos para agricultura están clasificados para una velocidad máxima de 20 mph (32 km/h).

# Realización de mantenimiento con seguridad

## Servicio y reparaciones completas antes de liberar la máquina

Apriete todos los pernos, accesorios y conexiones con las torsiones especificadas por el fabricante.

Instale todas las guardas, cubiertas y escudos después de realizar los servicios. Reemplace o repare los que estén dañados. Llene y recargue los sistemas a presión sólo con los fluidos aprobados o recomendados por el fabricante.

Arranque el motor y revise para detectar fugas. (Consulte la página 23, **Riesgos del sistema hidráulico**.) Haga funcionar todos los controles para asegurarse de que el tractor y la cortadora de césped funcionan correctamente. Pruebe la máquina si es necesario. Después de las pruebas, apague y verifique el trabajo realizado. ¿Falta algún pasador, arandela, tuerca de seguridad, etc.? Vuelva a revisar todos los niveles de fluidos antes de liberar la máquina para el funcionamiento.

Todas las piezas deben ser inspeccionadas durante la reparación y deben reemplazarse si están gastadas, rajadas o dañadas. Las piezas excesivamente gastadas o dañadas pueden fallar y causar lesiones o la muerte.

Reemplace cualquier letrero dañado o ilegible.



**Verifique el trabajo de servicio cuando está completo**

## Mantenimiento de las hojas de la cortadora

No corra riesgos usando hojas dañadas o dobladas. Los fabricantes de cortadoras de césped de la Asociación de Fabricantes de Equipos (Association of Equipment Manufacturers, AEM) y la Asociación de Fabricantes de Equipos para Agricultura (Farm Equipment Manufacturers Association, FEMA) piden que las hojas de cortadoras NO se reutilicen, enderecen, refuercen en su superficie o suelden. Si una hoja rota es arrojada por una cortadora, podrían producirse lesiones graves o la muerte.

# Realización de mantenimiento con seguridad

## Mantenimiento de las hojas de la cortadora (continuación)

- **¿Cómo están hechas las hojas de la cortadora de césped?** Están hechas acero para resortes de aleación de alta resistencia. Se forjan en caliente y se les da forma para cumplir con las especificaciones individuales del fabricante; luego, se tratan y templean a un estado dúctil, de alta resistencia para reducir la posibilidad de rupturas durante el corte. Las hojas se prueban para garantizar que cumplan con las normas de resistencia, dureza y ductilidad. Si una hoja no cumple con alguna de estas especificaciones, no se utilizará en la cortadora de césped.
- **¿Qué sucede cuando se dobla una hoja de la cortadora?** Se necesita una gran fuerza de impacto para doblar la hoja. Esta fuerza de impacto a menudo resulta en que las hojas se agujerean o marcan. Una vez que una hoja está dañada por un agujero o una marca, es mucho más probable que ocurra una falla de la hoja. Cuando una hoja está gravemente doblada, puede crearse una rajadura microscópica en ella. Enderezar la hoja no quita o repara esta rajadura, sino que puede causar rajaduras adicionales. Tensiones adicionales durante los trabajos de corte pueden resultar en una falla imprevista de la hoja.
- **Evite doblar las hojas.** Contribuya a prevenir que las hojas de la cortadora se doblen o rajen evitando el contacto con objetos sólidos. Las hojas de la cortadora de césped están destinadas a cortar hierba, arbustos, vegetación leñosa y árboles y ramas pequeños. No están diseñadas para entrar en contacto con objetos sólidos como roca, cemento o postes de acero. Inspeccione la zona antes de usar la cortadora. Retire o marque claramente los objetos sólidos y corte alrededor de ellos.
- **Sustituya las hojas dañadas!** Inspeccione las hojas de la cortadora diariamente o después de golpear algún objeto sólido. Si una hoja de la cortadora de césped se daña (está doblada, agujereada, rajada) o desgasta más del 25 por ciento del tamaño original, debe retirarse y sustituirse con una nueva. Siempre use las hojas originales del fabricante. Las hojas de marcas no originales pueden no cumplir con los requisitos de resistencia, dureza y ductilidad del fabricante de la cortadora.
- **No corra riesgos usando hojas dañadas o dobladas.** El uso de una hoja de cortadora dañada o enderezada puede resultar en la ruptura de la hoja y que la hoja sea arrojada hacia el operador o una persona ajena causando una lesión grave o la muerte. El precio de una nueva hoja es bajo en comparación con la posibilidad de una lesión grave que podría resultar de una hoja doblada o rota arrojada por la cortadora

## Palabras finales para el usuario

Acaba de terminar de leer el Manual de la cortadora de césped industrial y para agricultura AEM. Es imposible que este manual abarque todas las situaciones de seguridad que se podría encontrar a diario. Su conocimiento de estas precauciones de seguridad y de su cumplimiento de las reglas básicas de seguridad

contribuirán a formar un buen juicio en todas las situaciones. Nuestro objetivo es ayudarlo a desarrollar, establecer y mantener buenos hábitos de seguridad para que la operación de una cortadora de césped industrial y para agricultura le resulte más fácil y más segura.

Éste es otro manual de una serie publicada por AEM sobre la operación de maquinaria en condiciones de seguridad. Muchas de las ilustraciones de este manual de seguridad se pueden encontrar y descargar en <http://pictorials.aem.org>. Para obtener publicaciones adicionales, visite nuestro sitio web en [www.safetymaterials.org](http://www.safetymaterials.org).



ASOCIACIÓN DE FABRICANTES  
DE EQUIPOS

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[www.aem.org](http://www.aem.org)

# **INTRODUCTION SECTION**

Introduction Section 2-1

# INTRODUCTION

## INTRODUCTION

This Flail Mower is designed with care and built with quality materials by skilled workers. Proper assembly, maintenance, and operating practices, as described in this manual, will help the owner/operator get years of satisfactory service from the machine.

The purpose of this manual is to familiarize, instruct, and train. The Assembly Section instructs the owner/operator in the correct assembly of the Mower using standard and optional equipment. The Parts Manual is designed to familiarize the owner/operator with replaceable parts on the Mower and is provided also. This section provides exploded assembly drawings of each mower component illustrating each piece and the corresponding part number.

Careful use and timely service saves extensive repairs and costly downtime losses. The Operation and Maintenance Sections of the manual train the owner/operator how to work the Mower correctly and attend to appropriate maintenance. The Trouble Shooting Guide helps diagnose difficulties with mower and offers solution to the problems.

Safety is of primary importance to the owner/operator and to the manufacturer. The first section of this manual includes a list of Safety Messages, that, if followed, will help protect the operator and bystanders from injury or death. Many of the Safety Messages will be repeated throughout the manual. The owner/operator/dealer should know these Safety Messages before assembly and be aware of the hazards of operating this mower during assembly, use, and maintenance. The Safety Alert Symbol combined with a Signal Word, as seen below, is intended to warn the owner/operator of impending hazards and the degree of possible injury faced when operating this machine.



Indicates an imminently hazardous situation that, if not avoided, WILL result in DEATH OR VERY SERIOUS INJURY.



Indicates an imminently hazardous situation that, if not avoided, COULD result in DEATH OR SERIOUS INJURY.



Indicates an imminently hazardous situation that, if not avoided, MAY result in MINOR INJURY.

### Important

Identifies special instructions or procedures that, if not strictly observed, could result in damage to, or destruction of the machine, attachments or the environment.

# INTRODUCTION

## INTRODUCTION



**FCP-FL-0003**

Flex Flail FX17 and FX21 mowers are designed for medium-duty grass and small weed mowing at turf farms, parks, school grounds, golf courses, industrial sites, estates, sports fields, and all there sites where time, and immaculate cut, ad a smooth finish are required. The Flex Flail delivers an expert cut and finish, safe operation, outstanding durability, and fast completion of large mowing jobs. With a reasonable amount of preventative maintenance, your mower will provide years of dependable service. Each head is designed to deflect thrown objects downward instead of outward, to protect you, animals, and property. With a reasonable amount of preventative maintenance, your mower will provide years of dependable service.

#### **SPECIFICATIONS:**

Available Cutting Widths: 198" and 252".

Cutting Capacity: Grass

# INTRODUCTION

## INTRODUCTION

### Attention Owner/Operator

BEFORE OPERATING THIS MACHINE:

1. Carefully read the Operator's Manual, completely understand the Safety Messages and instructions, and know how to operate correctly both the tractor and implement.
2. Fill out the Warranty Card in full. Be sure to answer all questions, including the Serial Number of the implement. Mail within 30 days of delivery date of this implement.

**NOTE:** *Warranties are honored only if completed "Owner Registration and Warranty" forms are received by Alamo Group within thirty days of delivery of the implement.*

3. Record the Model and Serial Numbers on the Warranty page at the front of the Operator's Manual. Keep this as part of the permanent maintenance file for the implement.

# IMPORTANT

For your safety and to guarantee optimum product reliability, always use Genuine RHINO replacement parts. The use of inferior "will-fit" parts will void Warranty of your RHINO implement and may cause premature or catastrophic failure which can result in serious injury or death. If you have any questions concerning the repair parts you are using, contact Rhino, 1020 S. Sangamon Ave., Gibson City, Illinois 60936 A Member of Alamo Group





# **ASSEMBLY SECTION**

Assembly Section 3-1

# ASSEMBLY

## SETUP AND INSTALLATION INSTRUCTIONS

The mower comes shipped from the factory as a parts box, a base trailer, and the desired wings and rear head. Refer to the assembly instruction sheet 5020W for final assembly instructions.

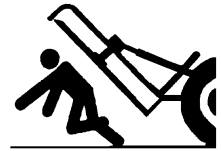
All references to location as right, left, front, rear, top, and bottom is viewed facing the direction of forward travel when the mower is properly attached to the tractor.

Select a suitable, solid, level work area to assemble mower components, perform maintenance, and make needed repairs.

Refer to the torque chart in the Maintenance Section when tightening hardware. All bolts are Grade 5 unless otherwise specified.



Never work under the Implement, the framework, or any lifted component unless the Implement is securely supported or blocked up to prevent sudden or inadvertent falling which could cause serious injury or even death. (SG-14)



Do not modify or alter this Implement. Do not permit anyone to modify or alter this Implement, any of its components or any Implement function. (SG-8)

# ASSEMBLY

## CHANGING ROTATION OF CUTTERSHAFT

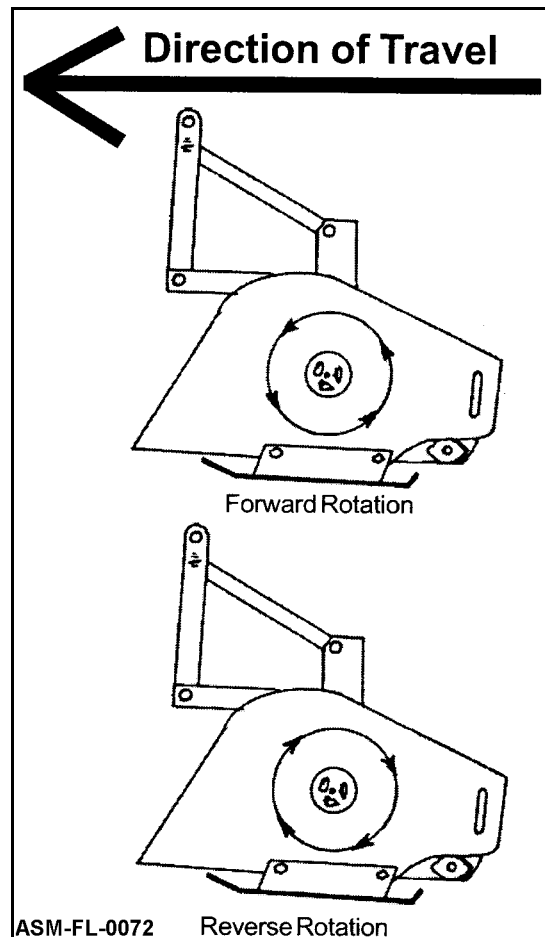
Standard cuttershaft rotation is forward rotation as shown in the diagram. To reverse cuttershaft rotation, the wing drive gearbox must be flipped over 180 degrees and the center mower drive components moved to the opposite side. When changing rotation of cuttershafts, (coarse cut only) knife pins on wing mower sections must be reinstalled in opposite direction.

### Center Cuttershaft Rotation Reversal

1. To reverse direction of cuttershaft rotation, three left hand parts must be ordered: belt guard, outboard bearing plate, and an idler pulley arm. A front trash deflector is also required. Refer to the parts section of this manual for part numbers and ordering information.
2. With the mower housing securely blocked up, remove cuttershaft and turn 180 degrees.
3. Remove gearbox cuttershaft drive pulley and outboard bearing plate. Attach new mounting plate to opposite side of mower housing.
4. Remove four gearbox bolts and rotate gearbox 180 deg. to new position.
5. Install cuttershaft pulley, gearbox output pulley, idler arm pulley assembly, and belt on housing right side.
6. Attach new belt guard.

### Wing Cuttershaft Rotation Reversal

1. Remove skid plate, front cover plate, and front shield.
2. Loosen powerband belt tensioner and remove powerband belt from gearbox sheave.
3. Remove four gearbox bolts and remove gearbox.
4. Change positions of gearbox vented plug and drain plug.
5. Rotate gearbox 180 deg. and remount.
6. Replace powerband belt and retension.
7. Reattach skid plate, front cover plate, and front shield.



# ASSEMBLY

## ASSEMBLY

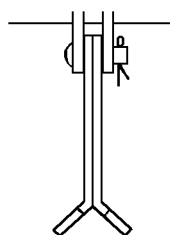
### CUTTER KNIFE INSTALLATION

Cutter knives are attached to the cutter shaft with hardened knife pins and cotter pins. These pins are supplied with the knife kit. To replace existing knives, remove and discard used pins and install new knives using new pins. Knife pins must be installed in certain direction to locate cotter pins where knives will not reach them when flexing backward. After installing cotter pins, bend extended prong at a 45 degree angle.

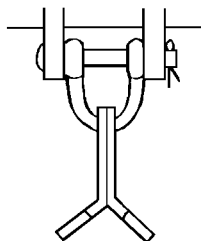
**FOR FORWARD ROTATION:** On the right wing and center unit, all knife pins must be installed with their heads facing away from the cuttershaft pulley. On the left wing, the heads of the knife pins must face the cuttershaft pulley.

**FOR REVERSE ROTATION:** On the right wing and center unit, all knife pins must be installed with their heads facing toward the cuttershaft pulley. On the left wing, the heads of the knife pins must face away from the cuttershaft pulley.

### FLAIL CUTTER KNIVES



Fine Cut Knife



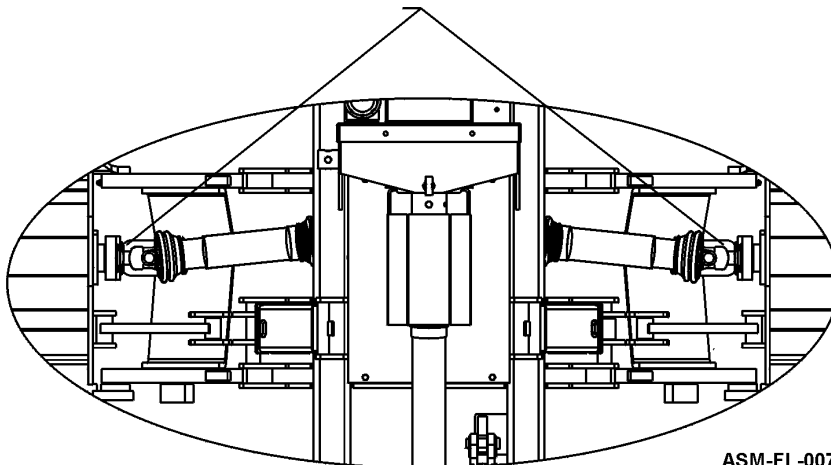
Coarse Cut Knife

ASM-FL-0073

### WING DRIVELINE TIMING

Wing drivelines must be timed (left and right driveline yokes must be orientated at same position) with one another to prevent damage to the driveline and gearbox when raising mower wings. If for any reason a wing driveline must be disconnected make certain to orientate driveline yokes at same orientation as opposite driveline wing when reconnecting.

Wing Drivelines must be timed to prevent damage when raising Mower wings.  
Install Driveline with Yoke at same position as shown.



ASM-FL-0074

# ASSEMBLY

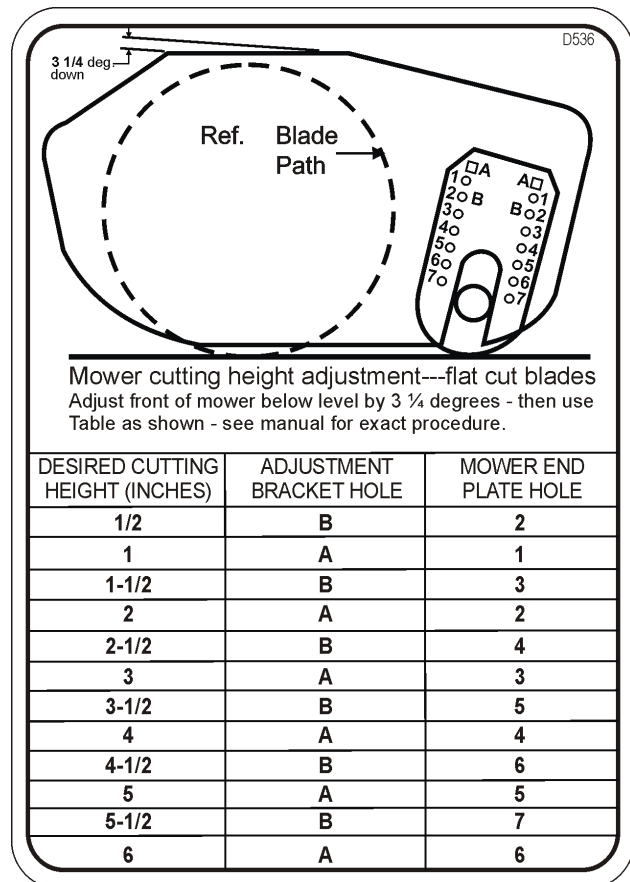
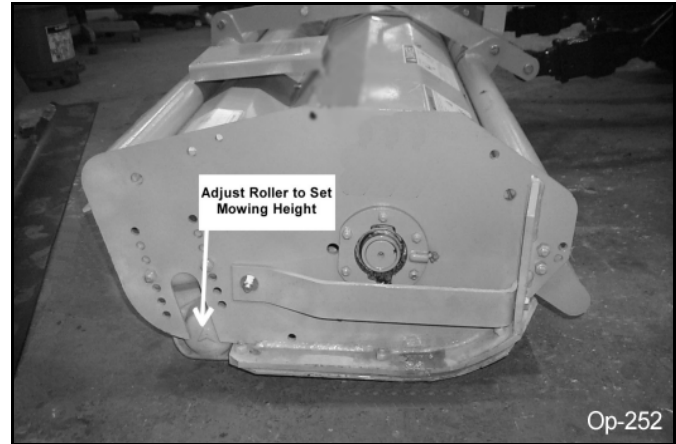
## SETTING CUTTING HEIGHT

### Roller Height Adjustment

The mower's cutting height is set by positioning the roller assembly for each mower section. Each section must be set at the same height to ensure an even cut across the entire width of the mower.

1. The mower's cutting height is set by positioning the roller assembly for each mower section. Each section must be set at the same height to ensure an even cut across the entire width of the mower.
2. Place the tractor and mower on a level surface and completely lower the mower to the ground.
3. Shut down the tractor, place the transmission in park, and set the parking brake before dismounting.
4. One section at a time, place lifting device (scissors jack or hydraulic jack) under center of cutter housing.
5. Remove hex nuts, washers and carriage bolts from bracket at each end of roller. Make certain that roller bracket is free to move once the fasteners are removed. A stuck roller could drop unexpectedly and cause injury.
6. Use lifting device to reposition cutter housing to desired cutting height. Align bracket holes with cutter housing, then reinstall hardware.
7. Lower cutter housing to the ground and remove lifting device.
8. Set cutting height according to procedures above for remaining two cutter sections. Make sure that all three rollers are set at the same height to ensure a even cut across the entire width of the mower.

**Note:** When using flat cut blades, adjust front of all mowing heads to be 3-1/4 degrees lower than rear. When using 45° blades adjust mowing heads level.

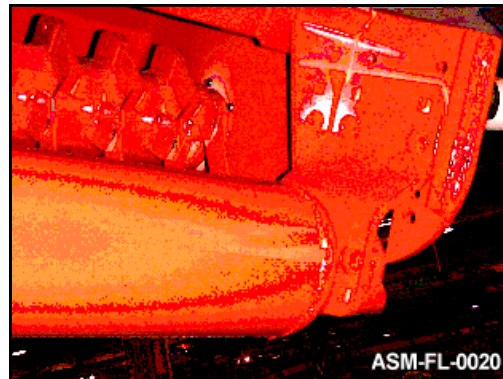


# ASSEMBLY

## ASSEMBLY

### RollerScraper Assembly Instruction Sheet - Part No. 5057W

1. Place the tractor and mower on a level surface, and completely lower the mower to the ground.
2. Working with one head at a time, place a jack under the cutter housing and raise the head such that the roller is slightly elevated from the ground.
3. Remove and discard the four carriage bolts that retain the two roller brackets. (See **ASM-FL-0020**.) These are the same bolts that would be removed to adjust the height.
4. Attach the two scraper brackets as shown in **ASM-FL-0021**. Use four of the new  $\frac{1}{2}$  x 2 in. carriage bolts supplied with the kit since these are longer to accommodate the thickness of the brackets.
5. Attach the scraper to the brackets as shown in Figure 2 using four  $\frac{1}{2}$  x 1-1/2 in. carriage bolts, washers, and nuts supplied with the kit.
6. Repeat this process for each head.
7. Verify that all bolts have been tightened.



# OPERATION SECTION

Operation Section 4-1

## OPERATION

## OPERATION

### RHINO FLEX FLAIL FX17/FX21 OPERATING INSTRUCTIONS

Rhino Flex Flail FX17/FX21 flail mowers are manufactured with quality material by skilled workers. These mowers are designed for cutting grass and small weeds. The mower is equipped with protective deflectors to prevent objects being thrown from the mower by the blades, however, no shielding is 100% effective. All shields, guards, and deflectors equipped on the mower must be maintained in good operational condition.

It is the operator's responsibility to be knowledgeable of all potential operating hazards and to take every reasonable precaution to ensure oneself, others, animals, and property are not injured or damaged by the mower, tractor, or a thrown object. Do not operate the mower if passersby, pets, livestock, or property are within 100 yards of the unit.

This section of the Operator's Manual is designed to familiarize, instruct, and educate safe and proper mower use to the operator. Pictures contained in this section are intended to be used as a visual aid to assist in explaining the operation of a flex-wing flail mower and are not specific to any model. Some pictures may show shields removed for picture clarity. NEVER operate implement without all shields in place and in good operational condition. The operator must be familiar with the mower and tractor and all associated safety practices before operating the mower and tractor. Proper operation of the mower, as detailed in this manual, will help ensure years of safe and satisfactory use of the mower.

**IMPORTANT:** To avoid mower damage, retorque all bolts after the first 10 hours of operation. Refer to the Torque Chart at the end of the Maintenance Section to ensure bolts are properly tightened.

**READ AND UNDERSTAND THE ENTIRE OPERATING INSTRUCTIONS AND SAFETY SECTION OF THIS MANUAL AND THE TRACTOR MANUAL BEFORE ATTEMPTING TO USE THE TRACTOR AND IMPLEMENT.** If you do not understand any of the instructions, contact your nearest authorized dealer for a full explanation. Pay close attention to all safety signs and safety messages contained in this manual and those affixed to the implement and tractor. OPS-U- 0001

READ, UNDERSTAND, and FOLLOW the following Safety Messages. Serious injury or death may occur unless care is taken to follow the warnings and instructions stated in the Safety Messages. Always use good common sense to avoid hazards. (SG-2)

**SAFETY  
INSTRUCTIONS**





# OPERATION

## 1. Standard Equipment and Specifications

	FX17	FX21
Horsepower Required (Min.)	40 HP	45 HP
Tractor PTO	540 RPM	540 RPM
Cutting Capacity	Grass & Small Weeds	Grass & Small Weeds
Cutting Height	1"-6"-12 Adjustments	1"-6"-12 Adjustments
Transport Width	96"	96"
Transport Height	88"	88"
Rear Safety Deflectors	Standard	Standard
Overall Width	204"	258"
Overall Length (Mowing)	156"	156"
Overall Length (Transport)	156"	156"
Decks	Two 62", One 88"	three 88"
Mower Head Overlap	6"	6"
Overall Weight (Approximate)	4450 lbs.	4674 lbs.
Max. Tongue Weight (Approximate)	700 lbs.	745 lbs.
Wing Lift	Hydraulic	Hydraulic
Operating Wing Flex Range	30° Up - 30° Down	30° Up - 30° Down
Jack Stand/Tow Chain	Standard	Standard
Hitch	Adjustable Clevis	Adjustable Clevis
Blades	Reversible	Reversible
Number of Blades Per Head:		
62" Fine Cut	76 Pair	N/A
Coarse Cut	36 Pair	N/A
88" Fine Cut	108 Pair	108 Pair
Coarse Cut	44 Pair	44 Pair
Blade Rotation	Reversible	Reversible
Main Drive Belt	5 Groove Powerband	5 Groove Powerband
Belt and Pulley Guard	Standard	Standard
Automatic Wing Transport Lock	Standard	Standard
Replaceable Skid Shoes	Standard	Standard
Driveline (Main)	Cat 4, Constant Velocity	Cat 4, Constant Velocity
Driveline (Rear)	Cat 4	Cat 4
Driveline (Wing)	Cat 3	Cat 3
Gearbox Rating (Main)	150 HP	150 HP
Blade Tip Speed	8900 fpm	8900 fpm
Transport Wheels	11L-15	11L-15
Transport Wheels Width	92"	92"
Cuttershaft Diameter	4-1/2"	4-1/2"
Cuttershaft Speed	2220 RPM	2220 RPM
Hood Thickness	10 Gauge	10 Gauge

\*Ratings based on actual field performance.



The Mower is designed for certain mowing applications and is rated to cut up to a specific size vegetation (see Mower Standard Equipment and Specifications). DO NOT use this mower to cut vegetation above the Mower's rated capacity or to cut any type of non-vegetative material. Only operate this Mower on a properly sized and equipped Tractor. Operating this Mower in an application for which it is not designed and/or operating the Mower with the wrong size Tractor can cause Mower component damage and equipment failure resulting in possible serious injury or death. (SGM-14)

# OPERATION

## OPERATION

### 2. OPERATOR REQUIREMENTS

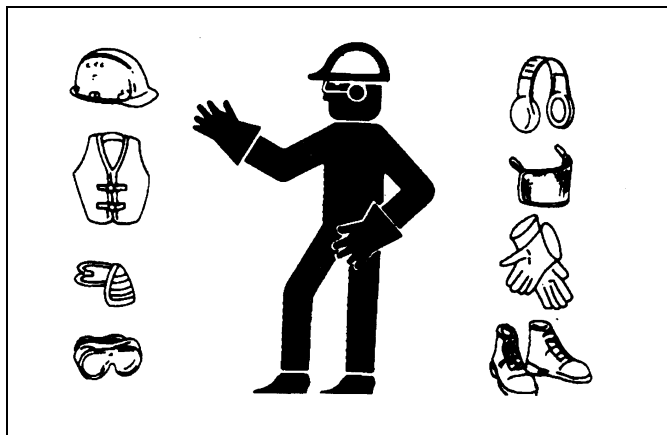
Safe operation of the unit is the responsibility of a qualified operator. A qualified operator has read and understands the implement and tractor Operator's Manuals and is experienced in implement and tractor operation and all associated safety practices. In addition to the safety messages contained in this manual, safety signs are affixed to the implement and tractor. If any part of the operation and safe use of this equipment is not completely understood, consult an authorized dealer for a complete explanation.

If the operator cannot read the manuals for themselves or does not completely understand the operation of the equipment, it is the responsibility of the supervisor to read and explain the manuals, safety practices, and operating instructions to the operator.

Safe operation of equipment requires that the operator wear approved Personal Protective Equipment (PPE) for the job conditions when attaching, operating, servicing, and repairing the equipment. PPE is designed to provide operator protection and includes the following safety wear:

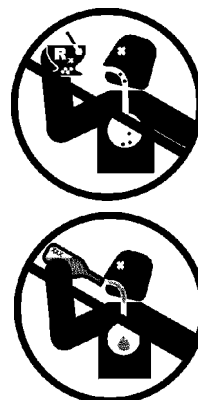
#### **PERSONAL PROTECTIVE EQUIPMENT (PPE)**

- Always Wear Safety Glasses
- Hard Hat
- Steel Toe Safety Footwear
- Gloves
- Hearing Protection
- Close Fitting Clothing
- Respirator or Filter Mask (depends on operating conditions) OPS-U- 0002



#### **⚠ DANGER**

DO NOT use drugs or alcohol immediately before or while operating the Tractor and Implement. Drugs and alcohol will affect an operator's alertness and coordination and therefore affect the operator's ability to operate the equipment safely. Before operating the Tractor or Implement, an operator on prescription or over-the-counter medication must consult a medical professional regarding any side effects of the medication that would hinder their ability to operate the Equipment safely. NEVER knowingly allow anyone to operate this equipment when their alertness or coordination is impaired. Serious injury or death to the operator or others could result if the operator is under the influence of drugs or alcohol. (SG-27)



# OPERATION

## 3. TRACTOR REQUIREMENTS

The tractor used to operate the mower must have the power, capacity and required equipment to safely operate the mower at a ground speed between 2 and 5 MPH. Operating the mower with a tractor that does not meet the following requirements may cause tractor or mower damage and could be a potential danger to the operator and passersby.

### Tractor Requirements and Capabilities

- ASAE approved Roll-Over Protective Structure (ROPS) or ROPS cab and seat belt.
- Tractor Safety Devices ..... Slow Moving Vehicle (SMV) emblem, lighting, PTO master shield
- Tractor Horsepower-Minimum ..... Rearmount Interstater 90hp
- Hydraulics..... 3 Sets of tractor remote auxiliary valves, 2 of which require a float-detent position
- Front End Weights..... As needed to maintain 20% weight on tractor front axle
- Power Take Off..... 540 RPM

### 3.1 ROPS and Seat Belt

The tractor must be equipped with a Roll-Over-Protective-Structure (ROPS) (tractor cab or roll-bar) and seat belt to protect the operator from falling off the tractor, especially during a roll over where the driver could be crushed and killed. Only operate the tractor with the ROPS in the raised position and seat belt fastened. Tractor models not equipped with a ROPS and seat belt should have these life saving features installed by an authorized dealer. *OPS-U- 0003*



Operate this Equipment only with a Tractor equipped with an approved roll-over-protective system (ROPS). Always wear seat belts. Serious injury or even death could result from falling off the tractor--particularly during a turnover when the operator could be pinned under the ROPS. (SG-7)



### 3.2 Tractor Safety Devices

If transporting or operating the tractor and implement near a public roadway, the tractor must be equipped with proper warning lighting and a Slow Moving Vehicle (SMV) emblem which are clearly visible from the rear of the unit. Lights and a SMV emblem must be equipped directly on implements if the visibility of the tractor warning signals are obscured.

Maintain all manufacturer equipped safety shields and guards. Always replace shields and guards that were removed for access to connect, service, or repair the tractor or implement. Never operate the tractor PTO with the PTO master shield missing or in the raised position. *OPS-U- 0004*

### 3.3 Tractor Horsepower

The horsepower required to operate the mower depends on many factors including the vegetation to be cut, terrain condition, operator experience, and condition of the mower and tractor. For most mowing condition, the Rear INT 88" & 96" mowers require a tractor with at least 60HP. Operating the mower with a tractor that does not have adequate power may damage the tractor engine.

# OPERATION

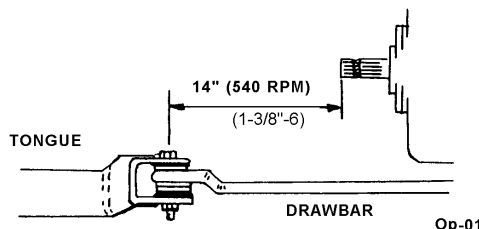
## OPERATION

### **3.4 Drawbar**

The tractor drawbar must be positioned at a certain length based on the operating speed of the mower to ensure proper driveline operation. 540 rpm mowers require the drawbar length measured from shaft end to hitch pin hole to be positioned at 14".

Ensure the drawbar is rated to carry the tongue weight of the mower.

### **Tractor Drawbar Length (Based on Mower Operating Speed)**



### **3.5 Tractor Hydraulics**

The mower is raised and lowered with three hydraulic cylinders, one for each section. Hydraulic lines are plumbed together and controlled by a single tractor hydraulic selective control valve. The tractor must be equipped with one single acting selective control valve with float detent to operate the mower hydraulics. During operation, the tractor hydraulics must be set in the float detent to enable the mower sections to follow the contour of the terrain.

### **3.6 Front End Weight**

Maintain a minimum of 20% total tractor weight on the tractor front end at all times. Front end weight is critical to maintain steering ability and to prevent the front end from rearing up. Consult your authorized tractor dealer for front weights and carriers.

### **3.7 Power Take Off (PTO)**

Only operate the mower on a tractor equipped to operate at 540 rpm PTO speed. Tractors operating at 540 rpm will have a 1-3/8" diameter 6-spline PTO shaft stub. Refer to the tractor operator's manual for operating the PTO at the proper speed.

#### **⚠ DANGER**

**DO NOT** use a PTO adapter to attach a non-matching Implement driveline to a Tractor PTO. Use of an adapter can double the operating speed of the Implement resulting in excessive vibration, thrown objects, and blade and implement failure. Adapter use will also change the working length of the driveline exposing unshielded driveline areas. Serious bodily injury and/or equipment failure can result from using a PTO adapter. Consult an authorized dealer for assistance if the Implement driveline does not match the Tractor PTO.

(S3PT-14)

#### **⚠ WARNING**

Never operate the Tractor and Mower if the Implement input driveline is directly connected to the Tractor transmission. Tractor braking distances can be substantially increased by the momentum of the rotating Mower blades driving the Tractor transmission even though the Tractor clutch has been disengaged. Install an over running clutch between the Tractor PTO and the Mower driveline to prevent this potentially dangerous situation. (S3PT-16)

# OPERATION

## **4. GETTING ON AND OFF THE TRACTOR**

Before getting onto the tractor, the operator must read and completely understand the implement and tractor operator manuals. If any part of either manual is not completely understood, consult an authorized dealer for a complete explanation. OPS-U- 0007



**WARNING**

Do not mount or dismount the Tractor while the tractor is moving. Mount the Tractor only when the Tractor and all moving parts are completely stopped. (SG-12)



### **4.1 Boarding the Tractor**

Use both hands and equipped handrails and steps for support when boarding the tractor. Never use control levers for support when mounting the tractor. Seat yourself in the operator's seat and secure the seat belt around you.

Never allow passengers to ride on the tractor or attached equipment. Riders can easily fall off and be seriously injured or killed from falling off and being ran over. It is the operator's responsibility to forbid all extra riders at all times. OPS-U- 0008



**DANGER**

Never allow children or other persons to ride on the Tractor or Implement. Falling off can result in serious injury or death. (SG-10)



**DANGER**

Never allow children to operate, ride on, or come close to the Tractor or Implement. Usually, 16-17 year-old children who are mature and responsible can operate the implement with adult supervision, if they have read and understand the Operator's Manuals, been trained in proper operation of the tractor and Implement, and are physically large enough to reach and operate the controls easily. (SG-11)



### **4.2 Dismounting the Tractor**

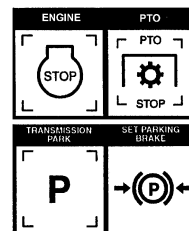
Before dismounting, park the tractor and implement on a reasonably level surface, apply the parking brake, idle the engine down, disengage the PTO, and lower the implement to the ground. Shut down the tractor engine according to the operator's manual, remove the key, and wait for all motion to completely stop. Never leave the seat until the tractor, its engine and all moving parts have come to a complete stop.

Use hand rails and steps when exiting the tractor. Be careful of your step and use extra caution when mud, ice, snow or other matter has accumulated on the steps or hand rails. Use all handrails and steps for support and never rush or jump off the tractor. OPS-U- 0009

# OPERATION

## **⚠ DANGER**

BEFORE leaving the tractor seat lower the implement, set the parking brake and/or set the tractor transmission in parking gear, disengage the PTO, stop the engine, remove the key, and wait for all moving parts to stop. Place the tractor shift lever into a low range or parking gear to prevent the tractor from rolling. Never dismount a Tractor that is moving or while the engine is running. Operate the Tractor controls from the tractor seat only. (SG-9)



## **⚠ DANGER**

Never run the Tractor engine in a closed building or without adequate ventilation. The exhaust fumes can be hazardous to your health. (SG-23)

## **⚠ DANGER**

Start tractor only when properly seated in the Tractor seat. Starting a tractor in gear can result in injury or death. Read the Tractor operators manual for proper starting instructions. (SG-13)



## **5. CONNECTING THE MOWER TO THE TRACTOR**

Use extreme caution when connecting the mower to the tractor. The mower should be securely resting at ground level or setting on blocks. Keep hands and feet from under the mower deck and clear of pinch points between the tractor hitch arms and mower pins. OPS-R-0001

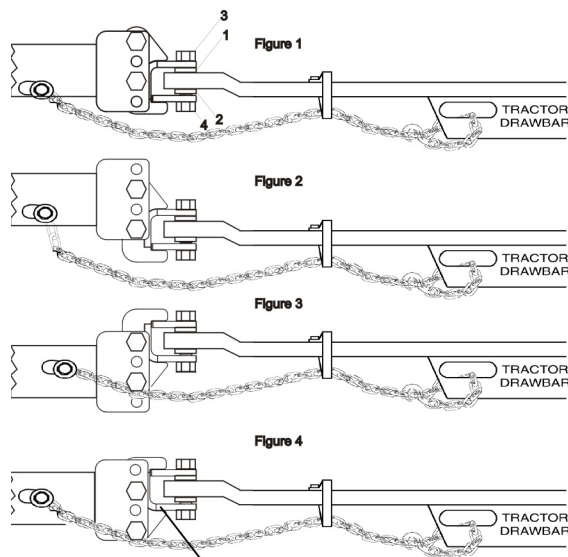
## **⚠ DANGER**

Always shut the Tractor completely down, place the transmission in park, and set the parking brake before you or anyone else attempts to connect or disconnect the Implement and Tractor hitches. (S3PT-15)

# OPERATION

## Connecting the Mower Tongue to the Tractor

1. The tractor must be equipped to operate at 540 rpm PTO speed and the drawbar length at 14".
2. Using the parking jack, position the tongue clevis to the height of the tractor drawbar.
3. Board the tractor and start the engine. Back the tractor to the mower aligning the drawbar hitch hole with the mower tongue clevis. Turn off the tractor engine, place the tractor in park, and set the parking brake before dismounting.
4. To connect the mower, place two 1" flatwashers(1) positioned under top lip of tongue clevis and to the top of drawbar. Insert a 1" diameter grade 5 or 8 bolt(3) through clevis and drawbar and retain in position with a 1" locknut(4). Tighten the locknut securely but do overtighten which could spring or break the clevis. NEVER attach mower to the tractor with a pin not having a nut.
5. After connecting the mower you can adjust tongue clevis up or down to level out mower. **Note:** *Frame must always be angled down 3 to 4 degrees so that wing mower head cut height can be properly set.* There are four settings to choose from. First two setting can raise the mower up if mower needs to be raised to be level. There is a 2" difference between both settings.(Refer to Figures 1 & 2). If mower needs to be lowered to be level, flip the clevis tongue upside down to lower the mower. There is also a 2" difference between both settings (Refer to Figures 3 & 4).
6. Securely attach the mower safety chain to the tractor drawbar or drawbar support frame.
7. Lower the jack until the tongue is completely supported by the drawbar. Remove jack from the tongue and place on storage bracket of the mower.



Tongue Clevis

Op-315

**Note:** By placing a 1" flatwasher #00759275 between drawbar and clevis the frame can be raised to proper level. Remove washers to lower.

## Safety Tow Chain

If the mower is towed on a public roadway, a safety chain with tensile strength equal to or greater than the gross weight of the mower must be connected between the tractor and mower. This will help control the implement in the event the tongue becomes disconnected from the drawbar. After connecting both ends of the safety chain, drive the tractor to the right and left to check for proper chain length. Adjust length as necessary and allow only enough slack in the chain to make a maximum turn in both directions.

# OPERATION

## OPERATION

### **5.1 Connecting Mower Hydraulics**

1. With the tractor shut down and secured in position, move the hydraulic remote valve lever back and forth several times or place the hydraulic lever in the float position to relieve all hydraulic pressure. When connecting the mower hydraulic lines to the tractor, keep the hose, quick couplers, and swivels free of dirt and other contaminants. Wipe all dirt and other contaminants from the tractor hydraulic remote ports and mower hydraulic hose coupler with a clean rag before connecting.
2. Connect mower hydraulic hose to the tractor remote port. Ensure the coupler locks in place making a good connection. Different tractor models receive hydraulic lines differently. Refer to the tractor Operator's Manual for connecting and operating hydraulics for your particular model tractor.
3. Ensure hydraulic hoses will not contact or become entangled with mower drivelines, do not bind when turning, or become pinched or kinked when operating, raising, and lowering the mower.



### **Hydraulic Cylinder Priming**

Hydraulic Cylinders must be filled with hydraulic oil before releasing the wing transport locks to lower the mower. Hydraulic cylinders and lines are filled by holding the valve control levers in the raised position until the cylinders fully extend then place the control lever in the float position. Repeat the process several more times to ensure wings are entirely supported by the hydraulic cylinders before releasing the transport locks and lowering the mower.

### **6. SETTING MOWER CUTTING HEIGHT**

Properly setting the cutting height is essential for efficient and safe operation. A properly set mower makes a more uniform cut, distributes clippings more evenly, increases tractor efficiency, and follows the contour of uneven terrain. Note: Avoid very low cutting heights, striking the ground with the blades gives the most damaging shock loads and will cause damage to the mower and drive. Blades contacting the ground may cause objects to be thrown out from under the mower deck.



Never work under the Implement, the framework, or any lifted component unless the Implement is securely supported or blocked up to prevent sudden or inadvertent falling which could cause serious injury or even death. (SG-14)





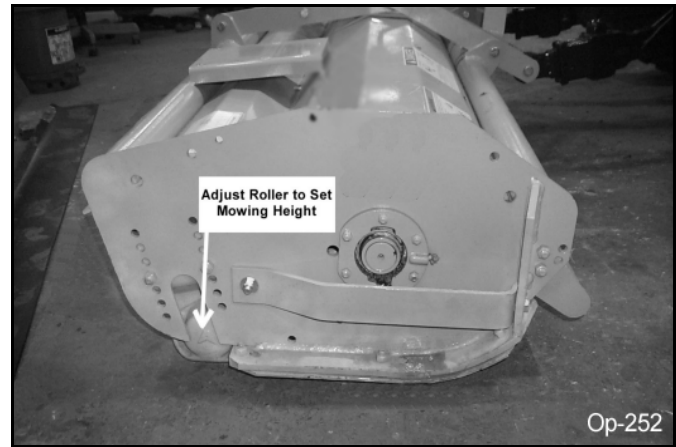
# OPERATION

## Roller Height Adjustment

The mower's cutting height is set by positioning the roller assembly for each mower section. Each section must be set at the same height to ensure an even cut across the entire width of the mower.

1. The mower's cutting height is set by positioning the roller assembly for each mower section. Each section must be set at the same height to ensure an even cut across the entire width of the mower.
2. Place the tractor and mower on a level surface and completely lower the mower to the ground.
3. Shut down the tractor, place the transmission in park, and set the parking brake before dismounting.
4. One section at a time, place lifting device (scissors jack or hydraulic jack) under center of cutter housing.
5. Remove hex nuts, washers and carriage bolts from bracket at each end of roller. Make certain that roller bracket is free to move once the fasteners are removed. A stuck roller could drop unexpectedly and cause injury.
6. Use lifting device to reposition cutter housing to desired cutting height. Align bracket holes with cutter housing, then reinstall hardware.
7. Lower cutter housing to the ground and remove lifting device.
8. Set cutting height according to procedures above for remaining two cutter sections. Make sure that all three rollers are set at the same height to ensure a even cut across the entire width of the mower.

**Note:** When using flat cut blades, adjust front of all mowing heads to be 3-1/4 degrees lower than rear. When using 45° blades adjust mowing heads level.



D536

Mower cutting height adjustment---flat cut blades  
Adjust front of mower below level by 3 1/4 degrees - then use Table as shown - see manual for exact procedure.

DESIRED CUTTING HEIGHT (INCHES)	ADJUSTMENT BRACKET HOLE	MOWER END PLATE HOLE
1/2	B	2
1	A	1
1-1/2	B	3
2	A	2
2-1/2	B	4
3	A	3
3-1/2	B	5
4	A	4
4-1/2	B	6
5	A	5
5-1/2	B	7
6	A	6

# OPERATION

## OPERATION

### **7. DRIVELINE ATTACHMENT**

The driveline yoke and tractor PTO shaft must be dirt free and greased for attachment.

To connect the mower driveline to the tractor PTO output shaft, pull the driveline yoke collar back and align the grooves and splines of the yoke with those of the PTO shaft. Push the driveline yoke onto the PTO shaft, release the locking collar, and position the yoke until the locking collar balls are seated onto the PTO shaft. Push and pull the driveline back and forth several times to ensure a secure attachment.

After the driveline is securely attached, place the tractor PTO master shield back in the operating position. OPS-R-0003



Ops-1144

#### **⚠ WARNING**

When attaching the Implement input driveline to the Tractor PTO, it is important that the connecting yoke spring activated locking collar slides freely and the locking balls are seated securely in the groove on the Tractor PTO shaft. Push and pull the driveline back and forth several times to ensure it is securely attached. A driveline not attached correctly to the Tractor PTO shaft could come loose and result in personal injury and damage to the Implement. (S3PT-17)

### **7.1 Driveline Length Check**

#### **⚠ WARNING**

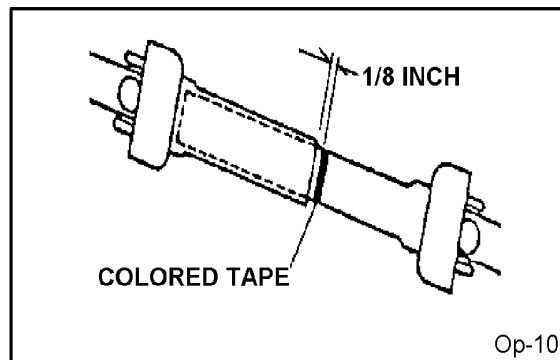
Before operating the Implement, check to make sure the Implement input driveline will not bottom out or become disengaged. Bottoming out occurs when the inner shaft penetrates the outer housing until the assembly becomes solid-it can shorten no more. Bottoming out can cause serious damage to the Tractor PTO by pushing the PTO into the Tractor and through the support bearings or downward onto the PTO shaft, breaking it off. A broken driveline can cause personal injury. (S3PT-18)

When fitting the mower to the tractor, the telescoping driveline must be inspected to ensure that at its most compressed position, the profiles do not “bottom out”, and when at its farthest extended position, there is sufficient engagement between the profiles to operate safely. At its shortest length, there must be at least a 1” clearance between each profile end and opposite profile universal joint. At its farthest operating extension, a minimum profile engagement of 12” must be maintained.

# OPERATION

## "Bottoming Out" Check Procedure

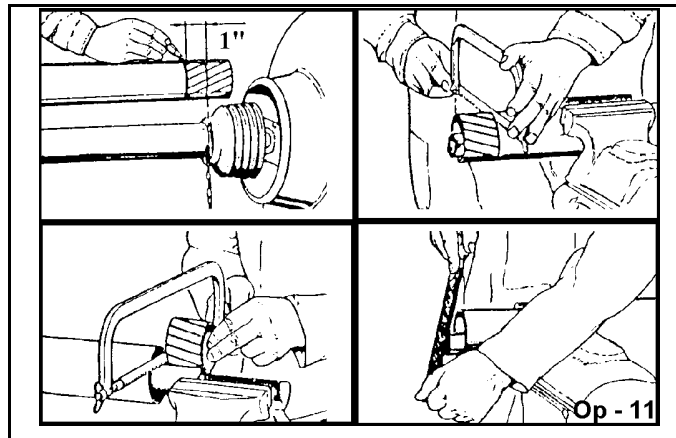
- Disconnect driveline from the tractor and slide the profiles together until fully compressed.
- Place a mark on the inner shield 1/8" from the end of the outer shield and reattach the driveline to the PTO Shaft.
- With the **PTO NOT TURNING**, slowly drive the tractor with mower attached through the sharpest turn possible and watch shaft movement. With the **PTO NOT TURNING**, slowly drive the tractor with the mower attached through the most severe terrain conditions expected and watch shaft movement.
- If the distance between the mark and the outer shield becomes less than 2" at any point there is a potential problem bottoming out the driveline and the driveline should be shortened.  
*OPS-F-0001*



Driveline in maximum compressed position

## Shorten the driveline profiles as follows:

- Remove the driveline from the tractor.
- Position the mower to the point with the shortest distance between the tractor PTO shaft and cutter gearbox. Shut down the tractor and securely block the mower in this position.
- Pull driveline apart and reattach yoke to PTO shaft.
- Hold driveline sections parallel to one another and measure back 1" from yoke of each shaft and place mark on opposite section. Cut this length off with a saw.
- Round off all sharp edges and debur.
- Thoroughly grease then reinstall the driveline.
- Recheck for proper operation.



## Engagement Check Procedure

- With the driveline attached, position the mower to the point where the telescoping driveline is at its maximum extension. Completely shut down the tractor and secure in position.
- Mark the inner driveline shield 1/8" from the end of the outer shield.
- Disconnect the driveline from the tractor and separate the two driveline halves.
- Measure the distance from the mark to the end of the inner profile. This length is the amount the driveline profiles were engaged.
- If the engaged length is less than 12" the shaft is considered too short and should be replaced with a longer shaft. Consult an authorized dealer to purchase the required driveline length.

**NOTE:** If the driveline cannot be shortened and still maintain the required profile engagement, the operator must be made aware of terrain conditions and avoid situations which pose a potential problem to avoid damaging the driveline.  
*OPS-F-0002*

# OPERATION

## OPERATION

### 7.2 Constant Velocity (CV) Driveline

For mowers equipped with a Constant Velocity (CV) driveline, the maximum turning angle between the tractor and mower must be determined to ensure the joint angle does not over-extend which can cause CV joint damage. Constant Velocity joints enable the driveline to operate smoothly with no vibrations and clattering at angles up to 70°. Angles greater than 80° can result in mechanical damage to the CV joint and mower driveline.

The Constant Velocity joint must be lubricated every 8 hours of operation as specified in the Maintenance Section. Failure to properly lubricate the joint will result in accelerated wear and joint component failure.

#### CV Driveline Maximum Angle Check Procedure

With the **mower attached** to the tractor and the **driveline disconnected** from the tractor PTO stub make a hard left turn until there is approximately a 1" clearance between the left rear tractor tire and mower frame or tongue.

Stop and completely shut down the tractor. Place the tractor in Park and apply the Parking Brake before dismounting.

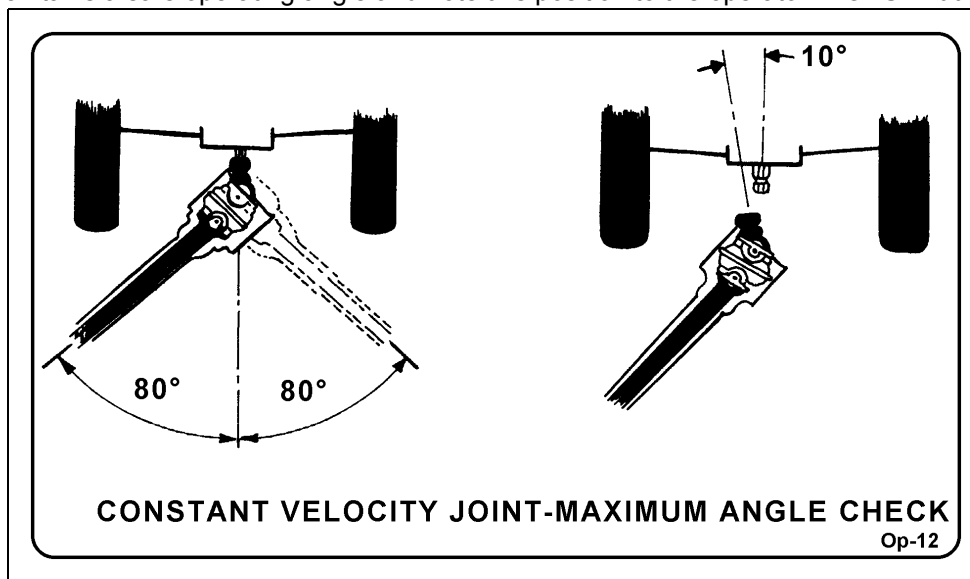
Check the CV joint at this maximum turning radius by holding the driveline yoke above the PTO shaft and then angle the CV joint to its maximum angle. A minimum difference of 10 degrees between the center line of the yoke and the PTO shaft must be maintained to ensure the joint will not be over angled. If the joint cannot be angled at least 10°, there is a potential problem of over-angling the joint while making sharp turns.

Solutions: To ensure the joint is not damaged, check the following:

Check the drawbar length to ensure that it is at the proper length for the RPM speed of the mower.

Move the tractor rear tires wider apart to limit the tractor turning radius.

Position the mower at multiple angles and perform the above procedure. Determine the sharpest turning radius that maintains a safe operating angle and note this position to the operator. OPS-R-0006



# OPERATION

## 8. PRE-OPERATION INSPECTION AND SERVICE

Before each use, a pre-operation inspection and service of the implement and tractor must be performed. This includes routine maintenance and scheduled lubrication, inspecting that all safety devices are equipped and functional, and performing needed repairs. DO NOT operate the unit if the pre-operation inspection reveals any condition affecting safe operation. Perform repairs and replacement of damaged and missing parts as soon as noticed. By performing a thorough pre-operation inspection and service, valuable down time and repair cost can be avoided. OPS-U-0029

### DANGER

Always disconnect the main PTO Driveline from the Tractor before performing service on the Implement. Never work on the Implement with the tractor PTO driveline connected and running. Rotating Parts, Blades or Drivelines could turn without warning and cause immediate entanglement, injury or death. (S3PT-11)

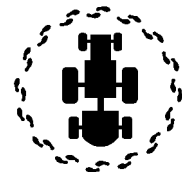
### DANGER

**DO NOT** allow any person under a folded wing unless wing is securely locked up or supported. **DO NOT** approach the Implement unless the Tractor is turned off and all motion has ceased. Never work under the frame work, or any lifted component unless the implement is securely supported or blocked up. A sudden or inadvertent fall by any of these components could cause serious injury or even death. (STI-03)



### WARNING

Periodically inspect all moving parts for wear and replace when necessary with authorized service parts. Look for loose fasteners, worn or broken parts, and leaky or loose fittings. Make sure all pins have cotter pins and washers. Serious injury may occur from not maintaining this machine in good working order. (SG-21)



# OPERATION

## OPERATION

### 8.1 Tractor Pre-Operation Inspection/Service

Refer to the tractor operator's manual to ensure a complete pre-operation inspection and scheduled service is performed according to the manufacturers recommendations. The following are some of the items that require daily service and inspection:

- Tire condition/air pressure
- Wheel lug bolts
- Steering linkage
- PTO shield
- SMV sign is clean and visible
- Tractor's lights are clean and functional
- Tractor Seat belt is in good condition
- Tractor ROPS is in good condition
- ROPS is in the raised position
- No tractor oil leaks
- Radiator free of debris
- Engine oil level and condition
- Engine coolant level and condition
- Power brake fluid level
- Power steering fluid level
- Fuel condition and level
- Sufficient lubrication at all lube points
- Air filter condition OPS-U-0030

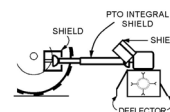


### 8.2 Mower Pre-Operation Inspection/Service

Before each mower use, a complete inspection and service is required to ensure the mower is in a good and safe working condition. Damaged and/or broken parts should be repaired and/or replaced immediately. To ensure the mower is ready for operation, conduct the following. OPS-R-0007



All Safety Shields, Guards and Safety devices including (but not limited to) - the Deflectors, Steel Guards, Gearbox Shields, PTO integral shields, and Retractable Door Shields should be used and maintained in good working condition. All safety devices should be inspected carefully at least daily for missing or broken components. Missing, broken, or worn items must be replaced at once to reduce the possibility of injury or death from thrown objects, entanglement, or blade contact. (SFL-5)



Replace bent or broken blades with new blades. NEVER ATTEMPT TO STRAIGHTEN, WELD, OR WELD HARDFACING ON BLADES SINCE THIS WILL LIKELY CRACK OR OTHERWISE DAMAGE THE BLADE WITH SUBSEQUENT FAILURE AND POSSIBLY CAUSE SERIOUS INJURY FROM THROWN BLADES. (SGM-10)

# OPERATION

The operator's manual and safety signs affixed on the unit contain important instructions on the safe and proper use of the equipment. Maintain these important safety features on the implement in good condition to ensure the information is available to the operator at all times.

- Ensure the manual canister is secured to the equipment with the operator's manual inside.
- Ensure all safety signs are in place and legible. Replace missing, damaged, and illegible decals. *OPS-U- 0011*



- Check that the main driveline securely attached to the tractor and the locking collar is seated in the groove of the PTO Shaft.
- Ensure wing hydraulics are secure at both ends.
- Ensure the mower hitch is securely attached to the tractor drawbar with a proper size bolt and secured nut.
- Ensure that a properly rated safety tow chain is equipped securing the mower to the tractor. *OPS-F- 0003*





# OPERATION

## OPERATION

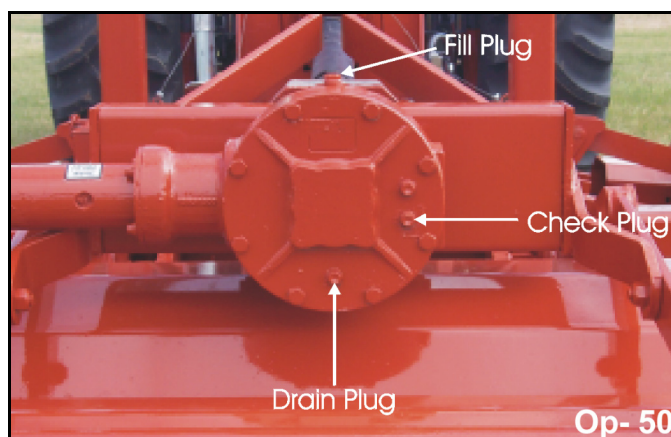
- Ensure rubber deflectors are in position and not damaged. Replace worn, broken, and missing sections immediately.
- Ensure the rollers are in good condition and rotate freely.
- Ensure the driveline integral shield is in good condition and rotate freely.
- Inspect that all bolts and screws are in position and are properly torqued. *OPS-F- 0004*



- Inspect the condition of the wings and rear section drive belts.
- Ensure the slip clutch (rear mower section only) is properly adjusted and the friction plates are not frozen together. Reference the Maintenance Section for proper slip clutch maintenance.
- Ensure the slip clutch shield and drive belts shields are in place and in good repair.
- Ensure the tractor PTO master shield is in place, lowered and in good condition. *OPS-F- 0005*



- Inspect oil level in gearbox and replenish if needed. A low oil level is a warning sign that the gearbox may be cracked or its seal is damaged and needs to be replaced.
- Check the oil level in tank and replenish if need. **NOTE:** Do not fill the tank with oil above the level of the sight gauge. Over filling the tank with oil after initial filling may result in oil being discharged through the air filter on the top of the hydraulic tank.
- Perform scheduled lubrication as specified in the maintenance section. *OPS-F- 0006*





# OPERATION

## OPERATION

- Inspect cutter knives and knife pins for looseness and excessive wear. Make sure the mower is securely blocked up before crawling beneath. Replace damaged, worn, and missing knives as complete sets to maintain cuttershaft balance.
- Remove any grass or other debris which may be wrapped around the cuttershafts.
- Inspect the condition of deck skid shoes and hardware. OPS-F- 0007



- Check for hydraulic oil leaks on the cylinders, along the hydraulic lines, and at tractor hydraulic ports. IMPORTANT: DO NOT use your hands to check for oil leaks. Use a piece of heavy paper or cardboard to check for hydraulic oil leaks.
- Ensure each hydraulic cylinder is installed and retained correctly. Ensure the proper size pins are used to retain the cylinders in place and are secured with pins. OPS-F- 0022



- Inspect mower tire condition, wheel bearings, and lug nut torque.
- Check the condition of the wing hinge pins.
- Check the overall condition of the mower main frame. OPS-F- 0023



# OPERATION

## Flex-Wing Flail PRE-OPERATION Inspection



Mower ID# \_\_\_\_\_

Make \_\_\_\_\_

Date: \_\_\_\_\_

Shift \_\_\_\_\_



Before conducting the inspection, make sure the tractor engine is off, all rotation has stopped and the tractor is in park with the parking brake engaged. Make sure the mower is resting on the ground or securely blocked up and all hydraulic pressure has been relieved.

OPERATION

Item	Condition at Start of Shift	Specific Comments if not O.K.
<b>FLEX-WING FLAIL MOWER</b>		
The Operator's Manual is in the canister on the mower		
All safety decals are in place and legible		
The tongue/hitch connection bolts & pins are tight		
There are no cracks in tongue or hitch		
The tow chain is secured to the tractor & mower		
The wing connection bolts & pins are tight		
The hydraulic cylinders pins are tight		
There are no leaking or damaged hoses		
Blades are not broken, chipped, cracked or bent		
Blade shackles are in good condition with no cracks		
The blade pins are properly retained		
Their guards/deflectors are in good condition		
The driveline/gearbox shields are in good condition		
The driveline clutch is in good condition, not frozen		
The driveline tubes & u-joints have been lubricated		
The driveline yoke is securely attached to the PTO		
The gearbox oil level is full		
The rear roller is in good condition and turns freely		
Wheel lug nuts are tight		
Transport locks are in good condition		

Operator's Signature: \_\_\_\_\_

**DO NOT OPERATE an UNSAFE TRACTOR or MOWER**

# OPERATION

## Tractor PRE-OPERATION Inspection



Tractor ID# \_\_\_\_\_

Make \_\_\_\_\_

Date: \_\_\_\_\_

Shift \_\_\_\_\_

### **WARNING**

Before conducting the inspection, make sure the tractor engine is off, all rotation has stopped and the tractor is in park with the parking brake engaged. Make sure the mower is resting on the ground or securely blocked up and all hydraulic pressure has been relieved.

Item	Condition at Start of Shift	Specific Comments if not O.K.
The flashing lights function properly		
The SMV Sign is clean and visible		
The tires are in good condition with proper pressure		
The wheel lug bolts are tight		
The tractor brakes are in good condition		
The steering linkage is in good condition		
There are no visible oil leaks		
The hydraulic controls function properly		
The ROPS or ROBS Cab is in good condition		
The seatbelt is in place and in good condition		
The 3-point hitch is in good condition		
The drawbar pins are securely in place		
The PTO master shield is in place		
The engine oil level is full		
The brake fluid level is full		
The power steering fluid level is full		
The fuel level is adequate		
The engine coolant fluid level is full		
The radiator is free of debris		
The air filter is in good condition		

Operator's Signature: \_\_\_\_\_

**DO NOT OPERATE an UNSAFE TRACTOR or MOWER**

OPERATION

# OPERATION

## OPERATION

### **9. DRIVING THE TRACTOR AND IMPLEMENT**

Safe tractor transport requires the operator possess a thorough knowledge of the model being operated and precautions to take while driving with an attached implement. Ensure the tractor has the capacity to handle the weight of the implement and the tractor operating controls are set for safe transport. To ensure safety while driving the tractor with an attached implement, review the following. *OPS-U- 0012*

Read all safety instructions. Decals on the Mower warn you of particular and multiple hazards. Some decals are attached close to part of the Mower where there is a possible hazard. Read and make sure you understand the safety messages before you operate the implement. Keep all decals clean and readable. Replace lost or damaged decals.

Power for operating the mower is supplied from the tractor PTO. Refer to your tractor manual instructions for engaging and disengaging the PTO. Start the tractor and idle at a slow engine speed until oil is being pumped.

Always engage the PTO at low engine RPM and run the mower for a short period until all air is removed from the hoses. Keep all person's well clear of mower since blades can throw objects with great velocity for a considerable distance! KEEP CLEAR!

Check the fluid level in the Hydraulic Tank and add oil if required. As the air has been forced out of the Hoses, it goes into the Hydraulic Tank and reduces the volume of oil. Maintain the oil level within the sight gauge located on the side of the reservoir. Never fill the tank above the sight gauge to allow for the expansion of the oil. The tank maintains pressure after the mower has been run. Stand off to one side when removing the breather cap element to prevent possible injury. To relieve pressure remove the breather cap element and depress the spring loaded pressure valve to release any excess air. Fill with Dexron® II Automatic Transmission Fluid.



This Implement may be wider than the Tractor. Be careful when operating or transporting this equipment to prevent the Implement from running into or striking sign posts, guard rails, concrete abutments or other solid objects. Such an impact could cause the Implement and Tractor to pivot violently resulting in loss of steering control, serious injury, or even death. Never allow the Implement to contact obstacles. (S3PT-12)

# OPERATION



Transport only at speeds where you can maintain control of the equipment. Serious accidents and injuries can result from operating this equipment at high speeds. Understand the Tractor and Implement and how it handles before transporting on streets and highways. Make sure the Tractor steering and brakes are in good condition and operate properly.



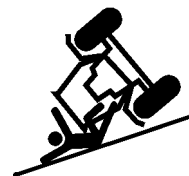
Before transporting the Tractor and Implement, determine the proper transport speeds for you and the equipment. Make sure you abide by the following rules:

Test the tractor at a slow speed and increase the speed slowly. Apply the Brakes smoothly to determine the stopping characteristics of the Tractor and Implement. As you increase the speed of the Tractor the stopping distance increases. Determine the maximum transport speed not to exceed 20 mph (30 kph) for transporting this equipment.

Test the equipment at a slow speed in turns. Increase the speed through the turn only after you determine that the equipment can be operated at a higher speed. Use extreme care and reduce your speed when turning sharply to prevent the tractor and implement from turning over. Determine the maximum turning speed for you and this equipment before operating on roads or uneven ground.

Only transport the Tractor and Implement at the speeds which allow you to properly control the equipment.

Be aware of the operating conditions. Do not operate the Tractor with weak or faulty brakes or worn tires. When operating down a hill or on wet or rain slick roads, the braking distance increases: use extreme care and reduce your speed. When operating in traffic always use the Tractor's flashing warning lights and reduce your speed. Be aware of traffic around you and watch out for the other guy. (SG-19)



## 9.1 Starting the Tractor

The procedure to start the tractor is model specific. Refer to the tractor operator's manual for starting procedures for your particular tractor. Consult an authorized dealer if the starting procedure is unclear. Ensure the 3-point control lever is in the lowered position and the PTO is disengaged before starting the tractor. OPS-U-0033



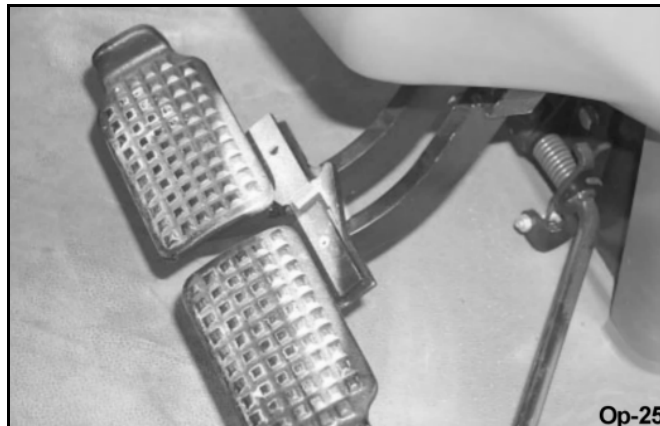
# OPERATION

## OPERATION

### **9.2 Brake and Differential Lock Setting**

Make sure the tractor brakes are in good operating condition. Tractor brakes can be set to operate independently allowing single rear wheel braking action or locked together to provide simultaneous rear wheel braking. **FOR MOST DRIVING AND OPERATING CONDITIONS, THE BRAKE PEDALS SHOULD BE LOCKED TOGETHER TO PROVIDE THE MOST EFFECTIVE BRAKING ACTION.**

Always disengage the tractor differential lock when turning. When engaged the differential lock will prevent or limit the tractor from turning. During normal cutting conditions, locking the differential provides no benefit and should not be used. *OPS-U-0013*



#### **⚠ WARNING**

Be aware of the operating conditions. Do not operate the Tractor with weak or faulty brakes. When operating down a hill or on wet or rain slick roads, the braking distance increases; use extreme care and reduce your speed in these conditions. When operating in traffic, always use the Tractor's flashing warning lights and reduce your speed. Be aware of traffic around you and watch out for the other guy.

### **9.3 Operating the Mower Wings**

#### **Transport Position**

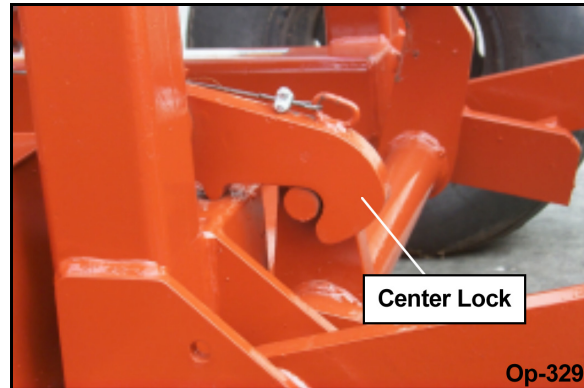
To raise the mower for transport, drive the unit to a level area, pull the rope to open the transport locks and retract the hydraulic cylinders. **DO NOT** raise wings with the mower positioned on an embankment or other inclined position to prevent overturning the mower. **DO NOT** raise the mower until all blade movement has come to a complete stop. After each section is fully raised, release the rope to engage the transport locks. Ensure transport locks have engaged on each section to prevent unexpected falling.





# OPERATION

The mowers's center of gravity is raised making the mower more prone to tipping when the wings are in the raised position. Use extreme caution when towing the mower in the transport position and avoid uneven terrain which could upset the mower.



## **⚠ DANGER**

When the Wings are folded for transport, the center of gravity is raised and the possibility of overturn is increased. Drive slowly and use extreme caution when turning on hillsides. Overturning the Implement could cause the Implement to overturn the Tractor and vice versa resulting in serious injury or even death. Never fold wings on a hillside...the Implement or unit may overturn. (STI-02)

### **Operating Position**

To lower the mower, retract the hydraulic cylinders to remove tension from the transport locks. Then pull the release rope and place the hydraulic control lever in the float detent to lower the mower.

The mower must be operated with the cutter sections fully lowered and the hydraulic control lever in the float detent to ensure the mower follows the contour of the ground and to prevent sections from creeping up. NEVER attempt to raise the mower while the mower is operating.



## **⚠ WARNING**

Use extreme care when lowering or unfolding the implement's wings. Make sure no bystanders are close by or underneath the wings. Allow ample clearance around the implement when folding or unfolding the wings. Use extreme caution around buildings or overhead power lines. (S3PT-05)

# OPERATION

## OPERATION

### **9.4 Driving the Tractor and Implements**

Start off driving at a slow speed and gradually increase your speed while maintaining complete control of the tractor and units. Moving slowly at first will also prevent the tractor from rearing up and loss of steering control. The tractor should never be operated at speeds that cannot be safely handled or which will prevent the operator from stopping quickly during an emergency. If the power steering or engine ceases operating, stop the tractor immediately as the tractor will be difficult to control.

Drive the tractor with the 3-Point lift arms in the raised position and lock the control lever in the transport detent position to prevent damage to the mower driveline and tongue when turning.

Perform turns with the tractor and units at slow speeds to determine how the tractor with an attached blade or rake handles a turn. Determine the safe speed to maintain proper control of the tractor when making turns. When turning with a towed implement, the overall working length of the unit is increased. Allow additional clearance for the units when turning, especially when the wings are lowered.

To avoid overturns, drive the tractor with care and at safe speeds, especially when operating over rough ground, crossing ditches or slopes, and turning corners. Tractor wheel tread spacing should be increased when working on inclines or rough ground to reduce the possibility of tipping. Use extreme caution when operating on steep slopes. Keep the tractor in a low gear when going downhill. DO NOT coast or free-wheel downhill. OPS-F- 0024

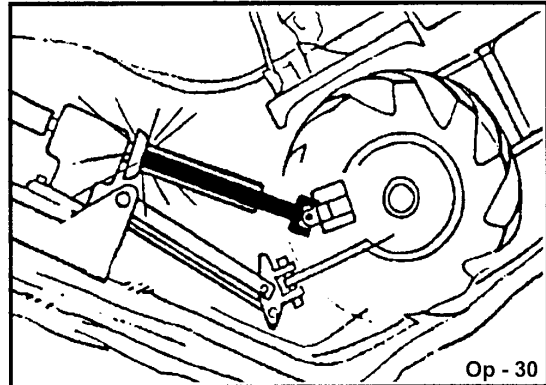




# OPERATION

## 9.5 Crossing Ditches and Steep Inclines

When crossing ditches with steep banks or going up sharp inclines, it is possible that the main driveline inner profile will penetrate into the outer housing to its maximum depth until the assembly becomes solid (driveline is at its extreme shortest length). This type of abusive operation can cause serious damage to the tractor and mower drive by pushing the PTO into the tractor and through the support bearings or downward onto the PTO shaft, breaking it off.

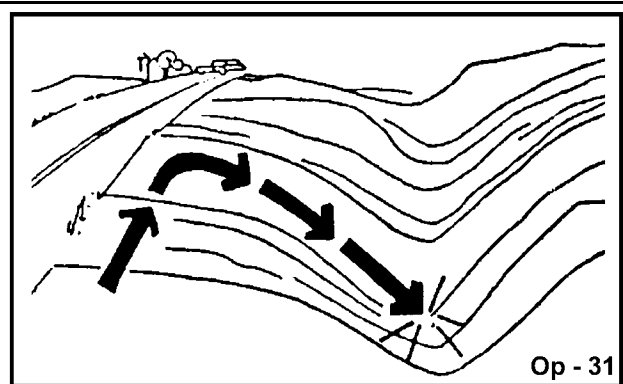


### **WARNING**

Damage resulting from over-collapse of the driveline's inner profile and its outer housing may allow the driveline to come loose from the Tractor which could cause bodily injury to the operator or bystanders and/or extensive damage to the Tractor or Implement. OPS-R-0020

When confronted with an incline or ditch, do not approach from an angle which is perpendicular or straight on as damaged to over collapse of the driveline may occur.

When crossing such terrain, the implement should be fully lowered for a lower center of gravity and added stability. OPS-R-0021



INCORRECT: DO NOT approach ditch straight on

## 10. OPERATING THE TRACTOR AND IMPLEMENT

**THE OPERATOR MUST COMPLETELY UNDERSTAND HOW TO OPERATE THE TRACTOR AND IMPLEMENT AND ALL CONTROLS BEFORE ATTEMPTING TO OPERATE.** The operator must read and understand the Safety and Operation Sections of the implement and tractor operator's manuals. These manuals must be read and explained to any operator who cannot read. Never allow someone to operate the implement and tractor without complete operating instructions.

Before starting any operation, the operator must become familiar with the area to be worked in and any obstacles and hazards contained within to ensure safety to the operator, bystanders, and equipment. Special attention should be paid to foreign debris, rough terrain, steep slopes, and passersby and animals in the area. OPS-U- 0015

# OPERATION

## **⚠ WARNING**

Extreme care should be taken when operating near loose objects such as gravel, rocks, wire, and other debris. Inspect the area before mowing. Foreign objects should be removed from the site to prevent machine damage and/or bodily injury or even death. Any objects that cannot be removed must be clearly marked and carefully avoided by the operator. Stop mowing immediately if blades strike a foreign object. Repair all damage and make certain rotor or blade carrier is balanced before resuming mowing. (SGM-05)



## **⚠ WARNING**

Many varied objects, such as wire, cable, rope, or chains, can become entangled in the operating parts of the mower head. These items could then swing outside the housing at greater velocities than the blades. Such a situation is extremely hazardous and could result in serious injury or even death. Inspect the cutting area for such objects before mowing. Remove any like object from the site. Never allow the cutting blades to contact such items. (SGM-06)

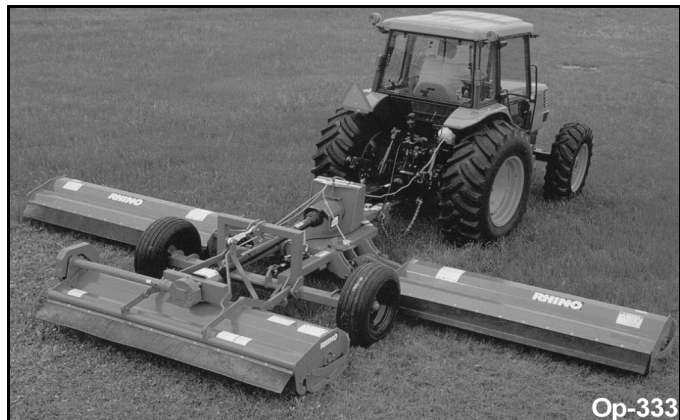
# OPERATION

## **10.1 Foreign Debris Hazards**

Before mowing, inspect the area to make sure there are no foreign objects that the mower blades could hit or become entangled with. Remove all foreign objects and debris. If objects are too big to remove, mark them clearly and be sure to prevent the mower blades from contacting them.

If you hit a solid object or foreign debris, stop the mower and tractor at once. Immediately idle the engine speed and disengage the PTO. Wait for all mower rotating motion to stop, then raise the mower and move the tractor and implement off the object. Inspect the area and remove, or mark the location of the debris. Inspect the condition of the mower and make any needed repairs immediately. Make sure the blades are not damaged and the carrier is balanced before resuming operation.

Always wear your seat belt securely fastened and only operate the tractor and mower with the ROPS in the raised position. If the tractor or mower hits a tree stump, rock, or bump, a sudden movement could throw you off of the seat and under the tractor and/or mower. The seat belt is your best protection from falling off the tractor and the ROPS provides protection from being crushed during a tractor roll-over. OPS-F-0025



## **10.2 Bystanders/Passersby Precautions**

If a bystander comes within 300 feet of the tractor while the mower is being operated, stop the tractor at once, idle the engine and disengage the PTO. Do not engage the PTO again until all bystanders are well past the 300 foot distance. OPS-R-0024

# OPERATION

## OPERATION



Flail Mowers are capable under adverse conditions of throwing objects for great distances (300 feet or more) and causing serious injury or death. Follow safety messages carefully.



STOP MOWING IF PASSERSBY ARE WITHIN 300 FEET UNLESS:

- Front and Rear Deflectors, Chain Guards, or Bands are installed and in good, workable condition;
- Mower sections or Wings are running close to and parallel to the ground without exposed Blades;
- All areas have been thoroughly inspected and all foreign material such as rocks, cans, glass, and general debris has been removed.

**NOTE:** *Where there are grass and weeds high enough to hide debris that could be struck by the blades, the area should be: inspected and large debris removed, mowed at an intermediate height, inspected closely with any remaining debris being removed, and mowed again at desired final height. (This will also reduce power required to mow, reduce wear and tear on the Mower drivetrain, spread cut material better, eliminate streaking, and make the final cut more uniform.)* (SFL-6)

### 10.3 Engaging the Power Take Off (PTO)

Before engaging the PTO, make certain that the area is clear of bystanders and passersby. The implement must be completely lowered and the deck positioned at a safe operating height. NEVER engage the PTO with the implement in the raised position.

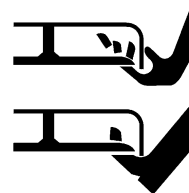
Set the tractor engine speed at approximately 1,000 RPM before engaging the PTO. Shift the PTO control to the on position, and slowly increase the engine speed until the PTO is operating at the rated speed. If you hear unusual noises or see or feel abnormal vibrations, disengage the PTO immediately. Inspect the implement to determine the cause of the noise or vibration and repair the abnormality. OPS-U- 0027



Do not let the Blades turn when the Mower Deck is raised for any reason, including clearance or for turning. Raising the Mower deck exposes the Cutting Blades which creates a potentially serious hazard and could cause serious injury or even death from objects thrown from the Blades. (SRM-07)



Do not put hands or feet under mower decks. Blade Contact can result in serious injury or even death. Stay away until all motion has stopped and the decks are securely blocked up. (SGM-09)



# OPERATION

## **10.4 PTO RPM and Ground Speed**

Ground speed for mowing will depend upon the height, type, and density of vegetation to be cut. Recommended speed for efficient mower performance is between 2 and 5 mph(3-8 kph). Operate the mower at its full rated PTO speed to maintain blade speed for a clean cut. Refer to the tractor operator's manual or the tractor instrument panel for the engine speed and gear to provide the required PTO and desired ground speed. Make sure that the mower is operating at its full rated speed before entering the vegetation to be cut. If it becomes necessary to temporarily regulate engine speed, increase or decrease the throttle gradually.

Ground speed is achieved by transmission gear selection and not by the engine operating speed. The operator may be required to experiment with several gear range combinations to determine the best gear and range which provides the most ideal performance from the mower and most efficient tractor operation. As the severity of cutting conditions increase, the ground speed should be decreased by selecting a lower gear to maintain the proper operating PTO speed. OPS-R-0025



Do not exceed the rated PTO speed for the Implement. Excessive PTO speeds can cause Implement driveline or blade failures resulting in serious injury or death. (SG-26)



Mow at the speed that you can safely operate and control the tractor and mower. The correct mowing speed depends on terrain condition and grass type, density, and height of cut. Normal ground speed range is from 2 to 5 mph(3-8 kph). Use slow mowing speeds when operating on or near steep slopes, ditches, drop-offs, overhead obstructions, power lines, or when debris and foreign objects are to be avoided. (SGM-07)

## **10.5 Operating the Mower**

Only operate the mower from the tractor operator's seat with the seatbelt securely fastened. The tractor must be equipped with a ROPS in the raised position or a ROPS cab.

The mower is designed to cut vegetation up to 1-1/2" in diameter. Sharp blades will produce a cleaner cut and require less power. Travel at a speed that allows the mower sufficient time to cut through the vegetation and maintain the PTO operating speed to prevent overloading the mower and tractor. Choose a driving pattern that provides the maximum pass length and minimizes turning.

Under certain conditions, tractor tires may roll some grasses down preventing them from being cut at the same height as the surrounding area. When this occurs, reduce the tractor ground speed while maintaining the operating speed of the mower. A slower ground speed will permit grasses to at least partially rebound and be cut. Taking a partial cut and/or reversing the direction of travel may also help produce a cleaner cut.

Avoid mowing in the reverse direction when possible. In situations where the mower must be backed to access areas to be cut, make sure there are no persons or other foreign debris behind the mower before mowing in reverse. When mowing in reverse, operate the tractor and mower at a reduced ground speed to ensure tractor and mower control is maintained. OPS-R-0026

# OPERATION

## OPERATION



Do not mow with two machines in the same area except with Cab tractors with the windows closed. (SGM-11)



Mow only in conditions where you have clear visibility in daylight or with adequate artificial lighting. Never mow in darkness or foggy conditions where you cannot clearly see at least 300 feet (90 m) in front and to the sides of the tractor and mower. Make sure that you can clearly see and identify passersby, steep slopes, ditches, drop-offs, overhead obstructions, power lines, debris and foreign objects. If you are unable to clearly see these type of items discontinue mowing. (SGM-1)



Avoid mowing in reverse direction when possible. Check to make sure there are no persons behind the mower and use extreme care when mowing in reverse. Mow only at a slow ground speed where you can safely operate and control the tractor and mower. Never mow an area that you have not inspected and removed debris or foreign material. (SGM-08)



Follow these guidelines to reduce the risk of equipment and grass fires while operating, servicing, and repairing the Mower and Tractor:



- Equip the Tractor with a fire extinguisher in an accessible location.
- Do Not operate the Mower on a Tractor with an underframe exhaust.
- Do Not smoke or have an open flame near the Mower and Tractor.
- Do Not drive into burning debris or freshly burnt areas.
- Ensure slip clutches are properly adjusted to prevent excessive slippage and plate heating.
- Never allow clippings or debris to collect near drivelines, slip clutches, and gearboxes. Periodically shut down the Tractor and Mower and clean clippings and collected debris from the mower deck. (SGM-12)

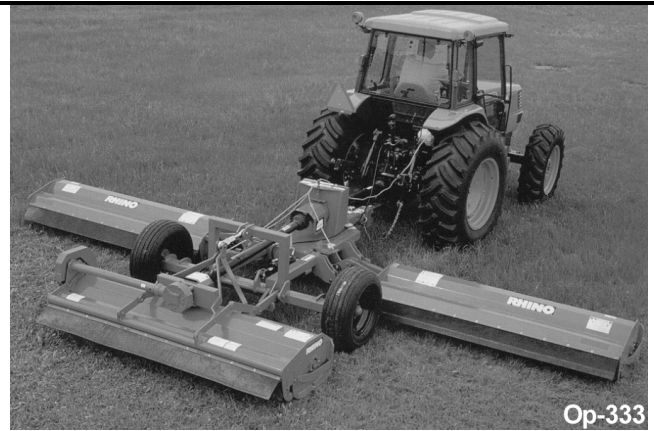
# OPERATION

## **10.6 Shutting Down the Implement**

To shut down the implement, first bring the tractor to a complete stop. Then slow down the implement by reducing the engine speed before disengaging the PTO. Wait for all motion to stop before proceeding to drive or shut down the tractor.



Park the tractor on a level surface, place the transmission in park or neutral and apply the parking brake, lower the attached implement to the ground, shut down the engine, remove the key, and wait for all motion to come to a complete stop before exiting the tractor. OPS-F- 0026



## **11. DISCONNECTING THE MOWER FROM THE TRACTOR**

Before disconnecting the mower, the PTO must be disengaged and all motion at a complete stop. Move the mower to a level storage location and lower both wings to the ground. If the mower will be stored with the sections in the raised position, be sure that the locks are engaged. If the mower is not resting securely on the ground, block the mower up securely before attempting to disconnect it from the tractor. Use extreme care to keep feet and hands from under the mower and clear of any pinch points. OPS-F-0012\_B

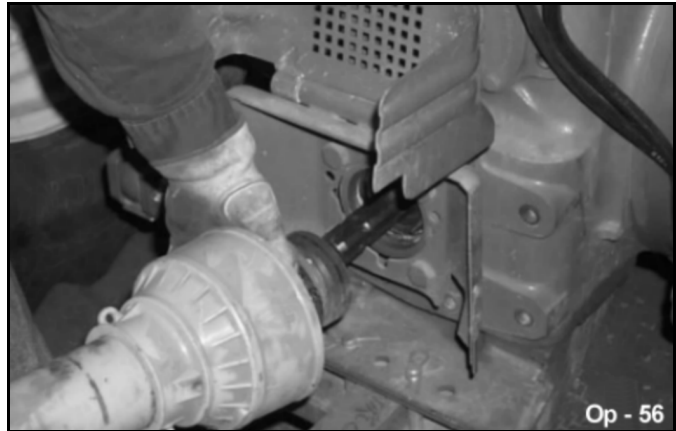


## OPERATION

### OPERATION

Remove the mower driveline from the tractor PTO shaft. Lay the driveline down carefully to avoid damaging the driveline or its shield. Do not let the driveline fall into mud or dirt, which can contaminate the bearing and shorten the life of the driveline.

Remove bolt, nut and washers, retaining mower clevis to tractor and drawbar. OPS-F-0013\_A



#### DANGER

Never work under the Implement, the framework, or any lifted component unless the Implement is securely supported or blocked up to prevent sudden or inadvertent falling which could cause serious injury or even death. (SG-14)



#### DANGER

Never allow children to play on or around Tractor or Implement. Children can slip or fall off the Equipment and be injured or killed. Inadvertent contact with controls can cause the Implement to shift or fall crushing themselves or others. (SG-25)



# OPERATION

## **12. MOWER STORAGE**

It is recommended that the mower be stored with the center section and both wings fully lowered to ground level. If the mower is stored with the wings in the raised position, select a level area and install wing transport braces to prevent the wings from falling BEFORE disconnecting the mower hitch from the tractor.

Properly preparing and storing the mower at the end of the season is critical to maintaining its appearance and to help ensure years of dependable service. The following are suggested storage procedures:

- Thoroughly clean all debris off the mower to prevent damage from rotting grass and standing water.
- Lubricate all mower grease points and fill gearbox oil levels as detailed in the maintenance section.
- Tighten all bolts and pins to the recommended torque.
- Check the mower for worn and damaged parts. Perform repairs and make replacements immediately so that the mower will be ready for use at the start of the next season.
- Store the mower in a clean, dry place with the mower housing resting securely on blocks or at ground level.
- Keep the driveline yoke from sitting in water, dirt and other contaminants.
- Use spray touch-up enamel where necessary to prevent rust and maintain the appearance of the mower.



It is critical that driveline clutches slip when an obstacle or heavy load is encountered to avoid mower and/or tractor damage. If the mower sits outside for an extended period of time or is exposed to rain and/or humid air, the clutch lining plates must be inspected to ensure they are not frozen together from rust or corrosion. If the mower has been exposed to such conditions, at the start of each mowing season, and any time it is suspected that the slip clutch plates may be frozen together, readjust the slip clutch as detailed in Seasonal Clutch Maintenance of the maintenance section in this manual. *OPS-F-0027*

## **13. TRANSPORTING THE TRACTOR AND IMPLEMENT**

Inherent hazards of operating the tractor and implement and the possibility of accidents are not left behind when you finish working in an area. Therefore, the operator must employ good judgement and safe operation practices when transporting the tractor and implement between locations. By using good judgement and following safe transport procedures, the possibility of accidents while moving between locations can be substantially minimized. *OPS-U- 0017*

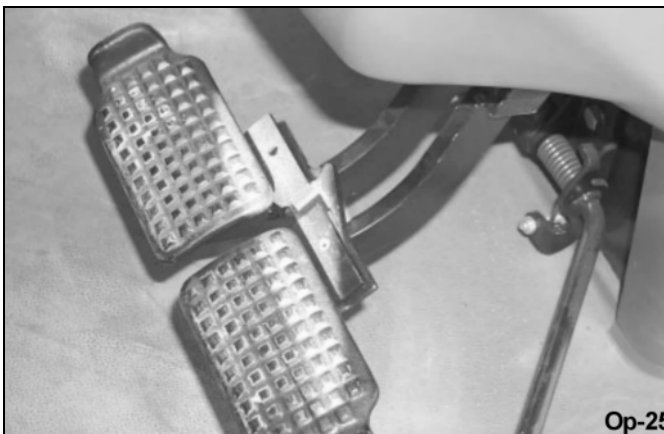
# OPERATION

Before transporting the tractor and mower, idle the tractor engine, disengage the PTO and wait for all mower moving parts to come to a complete stop. Raise the mower sections and ensure transport locks engage.



Before transporting the tractor on a public roadway or boarding a trailer for transport, the tractor brake pedals should be locked together. Locking the pedals ensures that both wheels brake simultaneously while stopping, especially when making an emergency stop.

Use extreme caution and avoid hard applications of the tractor brakes when towing heavy loads at road speeds. Never tow the implement at speeds greater than 20 MPH (32 kph). OPS-U- 0018



If the tractor's hydraulic pump is not independent of the tractor PTO, or if the tractor PTO has to be run to have hydraulic power, disconnect the mower driveline from the tractor PTO output shaft. Secure the driveline to the mower deck to prevent driveline damage or loss during transport.

# OPERATION

**NOTE:** Ensure that the mower sections are fully raised and that the transport locks are engaged for each section.

## **WARNING**

Only tow the Implement behind a properly sized and equipped Tractor which exceeds the weight of the Implement by at least 20%. DO NOT tow the Implement behind a truck or other type of vehicle. Never tow the Implement and another Implement connected in tandem. Never tow the Implement at speeds over 20 MPH. (STI-06)



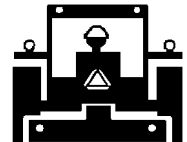
## **DANGER**

Never allow children or other persons to ride on the Tractor or Implement. Falling off can result in serious injury or death. (SG-10)



## **WARNING**

Make certain that the “Slow Moving Vehicle” (SMV) sign is installed in such a way as to be clearly visible and legible. When transporting the Equipment use the Tractor flashing warning lights and follow all local traffic regulations. (SG-6)



The SMV (Slow-Moving Vehicle) emblem is universal symbol used to alert drivers of the presence of equipment traveling on roadways at a slow speed. SMV signs are a triangular bright orange with reflective red trim for both easy day and night visibility. Make sure the SMV sign is clean and visible from the rear of the unit before transporting the tractor and implement on a public roadway. Replace the SMV emblem if faded, damaged, or no longer reflective. OPS-U- 0020



Op-43

Make sure that all tractor flashing warning lights, headlights, and brake/tail lights are functioning properly before proceeding onto public roads. While newer model tractors have plenty of lighting to provide warning signals and operating lighting, most older models are only equipped with operating lights. Consult an authorized tractor dealer for lighting kits and modifications available to upgrade the lighting on older tractor models. OPS-U- 0021



Op-595

# OPERATION

## OPERATION

When operating on public roads, have consideration for other road users. Pull to the side of the road occasionally to allow all following traffic to pass. Do not exceed the legal speed limit set in your country for agricultural tractors. Always stay alert when transporting the tractor and implement on public roads. Use caution and reduce speed if other vehicles or pedestrians are in the area. *OPS-U- 0022*



### **13.1 Hauling the Tractor and Implement**

Before transporting a loaded tractor and implement, measure the height and width dimensions and gross weight of the complete loaded unit. Ensure that the load will be in compliance with the legal limits set for the areas that will be traveled through. *OPS-U- 0024*



Use adequately sized and rated trailers and equipment to transport the tractor and implement. Consult an authorized dealer to determine the proper equipment required. Using adequately sized chains, heavy duty straps, cables and/or binders, securely tie down both the front and rear of the tractor utilizing the proper tie down locations as specified by the tractor manufacturer. *OPS-U- 0025*



## OPERATION

Arrange the chains so that when tightened, the chains are pulling downward and against themselves. Carefully tighten the securing chains or other fasteners using boomers or binders to apply maximum tension. Use extreme care when attaching and removing the securing devices as the extreme tension involved when released has the potential to inflict serious injury.

While hauling the tractor and implement, make occasional stops to check that the tractor and implement have not moved or shifted and that the securing chains have maintained tension. If during transport a hard braking, sharp turning, or swerving action was performed, stop at the next safe location to inspect the security of the load. *OPS-U- 0026*



Op - 48

# OPERATION

## 14. TROUBLESHOOTING GUIDE

TROUBLE	POSSIBLE CAUSE	POSSIBLE REMEDY
Excessive Vibrations	Check Gearbox Bolts. Check for missing Knives on Cuttershaft. Check to see if Knives are free swinging. Blade broken or bent. Cuttershaft bent. Drivelines not phased correctly. Implement & Tractor yokes must be in line.	Tighten if loose. Replace missing Knives. Free Knives so they swing. Replace Blades. Replace Cuttershaft. Replace Driveline.
Gearbox overheating	Low on Lubricant. Improper type lubricant. Excessive trash build-up around gearbox. Bearings or Gears set up improperly.	Fill to Level Plug. Replace with proper lubricant. Remove trash. Consult your Dealer.
Gearbox Noisy	Rough Gears. Worn Bearing.	Run in or change Gears. Replace Bearing.
Noise	Damaged Belt Shield (Rubbing on pulleys or belt) Worn Bearing or Gear.	Straighten or replace Shields. Replace Bearing or Gear.
Gearbox leaking.	Damaged Oil Seal. Bent Shaft. Shaft rough in Oil Seal area. Oil Seal installed wrong. Oil Seal not sealing in the housing. Oil level too high. Sand hole in Casting. Gasket damaged.	Replace Seal. Replace Oil Seal and Shaft. Replace or repair Shaft. Replace Shield. Replace Seal or use a sealant on OD of Seal. Drain Oil to proper level. Replace Castings or Gearbox. Replace Gasket.

# OPERATION

## OPERATION

TROUBLE	POSSIBLE CAUSE	POSSIBLE REMEDY
Knives wear too fast. .	Cutting in sandy conditions. Cutting in rocky conditions. Soft "Will Fit" Knives Cutting too close to ground.	Increase cutting height. Increase cutting height. Use genuine Rhino Knives. Raise cut height.
Hydraulic Cylinder will not operate.	Not enough pressure. Valve not connected properly. Quick Coupler not completely connected.	Check pressure. Re-plumb Valve. Complete connections.
Oil squirting from Breather Vent Hole	Oil leaking by Piston Ring. Small leakage amount is normal. Piston Seal worn. Cylinder wall scored or pitted. Wrong Piston Ring on Piston.	Do not carry Cutter on Cylinder.  Replace Piston Seal. Replace Cylinder. Use correct Piston Rings.
Discharging Bunches or clogging.	Belt installed improperly. Blade Dull. Grass too wet. Grass too long. Travel speed too fast. PTO RPM too low.	Check belt for correct set-up. Check Blades for sharpness. Wait for grass to dry. Mow at 3-1/2" and recut lower. Use a lower tractor gear. Mow at engine RPM to match 540 PTO RPM.
Blade Scalping High Places.	Mowing too low. Rough, uneven ground.  Turning Tractor too fast.	Raise height of cut. Lower Rollers. Use a slower speed. Slow down when turning.
Uneven cut.	Travel speed too fast. Mower deck not level. Blades dull or unbalanced. Deck underside plugged. Grass too high.	Use a slower speed Level the mowing deck. Sharpen or balance blades. Clean underside of deck. Mow 3-1/2" and recut lower.

# OPERATION

## OPERATION

TROUBLE	POSSIBLE CAUSE	POSSIBLE REMEDY
Grass Clippings windrow or	Grass too wet. Grass too high. Housing plugged.	Wait for grass to dry. Mow at 3-1/2" and recut lower. Clean underside of deck.
Grass no being cut evenly.	Belt worn or slipping. Spring broke and Belt off Idler. Housing plugged. Debris around pulleys.  Grass too high.	Mow at full engine RPM. Replace Spring or adjust Belt. Clean underside of Housing. Remove Deck Belt Shield and clean out debris. Mow at 3-1/2" and recut lower.



# **MAINTENANCE SECTION**

Maintenance Section 5-1

# MAINTENANCE

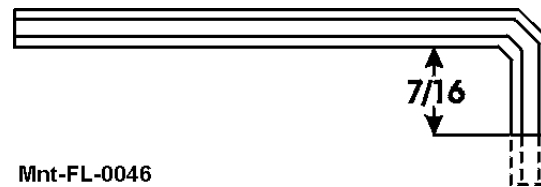
## MAINTENANCE

### Maintenance Instructions

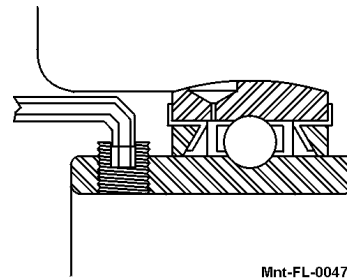
Before operating the mower, make sure it is properly lubricated and thoroughly inspected. Only a minimum of time and effort is required to regularly lubricate and maintain this machine to provide long life and trouble free operation.

Check all bolt tightness BEFORE initial operation of the mower. Retorque all hardware after the first 4 hours of operation. A torque chart is provided at the end of the maintenance section.

**NOTE:** Before initial start up check outer cuttershaft bearing setscrews. Standard 3/16" allen wrench must be modified as shown.



This modified tool allows access between housing and bearing inner race to tighten setscrews. Check setscrews after first days operation. If loose tighten and recheck again next day or until setscrews are found to remain tight.



### Daily Checks

1. Visually inspect the overall condition of the mower. Make certain that all items are in good repair and all hardware is properly tightened.
2. Check the cuttershaft to make certain it is fully knifed. Replace any missing or damaged knives and pins. Run the unit at full speed to check for vibrations. Do not operate the unit in an out-of-balance condition.
3. Grease the mower and check gearbox oil levels.



Never work under the Implement, the framework, or any lifted component unless the Implement is securely supported or blocked up to prevent sudden or inadvertent falling which could cause serious injury or even death. (SG-14)



Do not modify or alter this Implement. Do not permit anyone to modify or alter this Implement, any of its components or any Implement function. (SG-8)

# MAINTENANCE

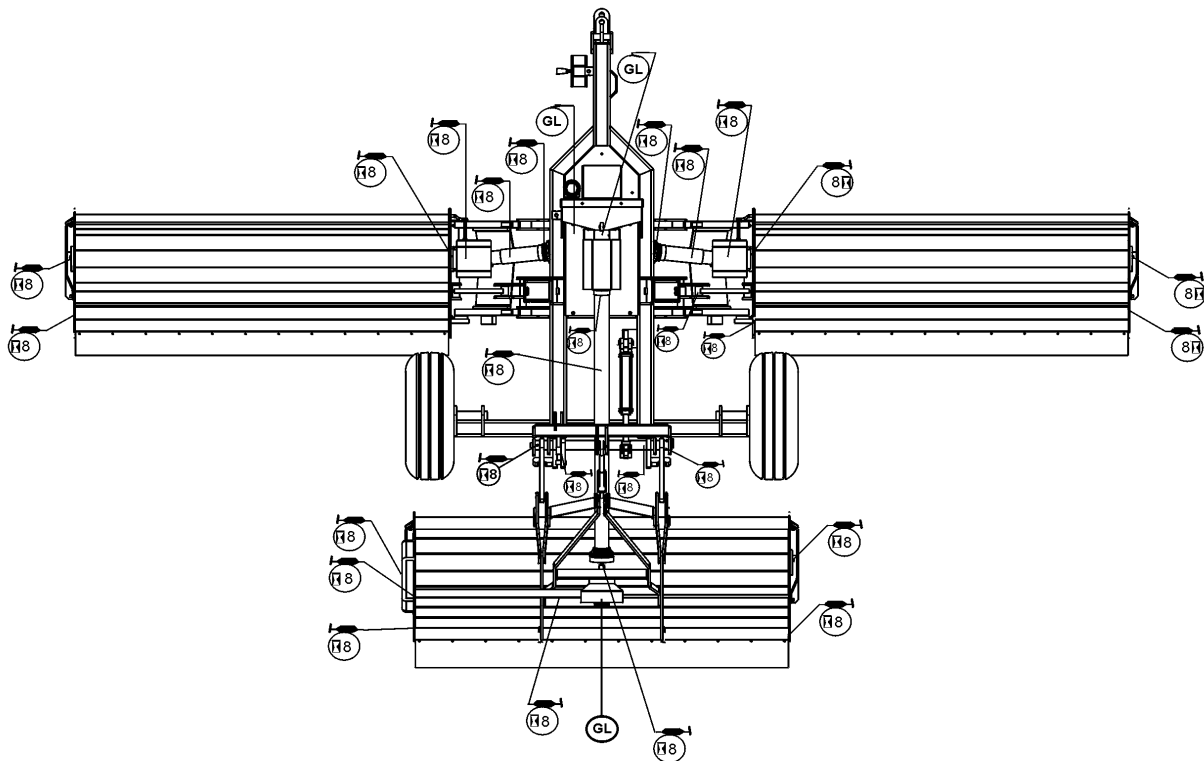
## MAINTENANCE

### Mower Lubrication

Before operating your Mower, make sure it is properly lubricated and thoroughly inspected. Only a minimum of time and effort is required to regularly lubricate and maintain this machine to provide long life and trouble free operation.

Do not let excess grease collect on or around parts, particularly when operating in sandy areas. The mower illustration shows grease and gear lube locations. All grease fittings should be greased every 8 hours of operation and the gearbox oil levels checked daily. Severe or unusual conditions may require more frequent lubrication. Gearboxes are shipped with the proper amount of Multi-Purpose Gear Oil P/N 00786250. Maintain the oil level at the check plug level (LOWER plug on the center section gearbox). LUBRICATE MOWER BEFORE INITIAL USE. Lubricate all locations noted with grease gun (Figure Mnt-FL-0048) using N.L.G.I. #2 grease.

**NOTE:** Lubricate roller bearings until grease is seen coming out between roller and bearing housing.



Grease every 8 hours of operation with SAE multi-purpose lithium grease.



Check gear lube daily. Replenish as required to check plug level with SAE 85W140 extreme pressure lubricant.

Mnt-FL-0048

# MAINTENANCE

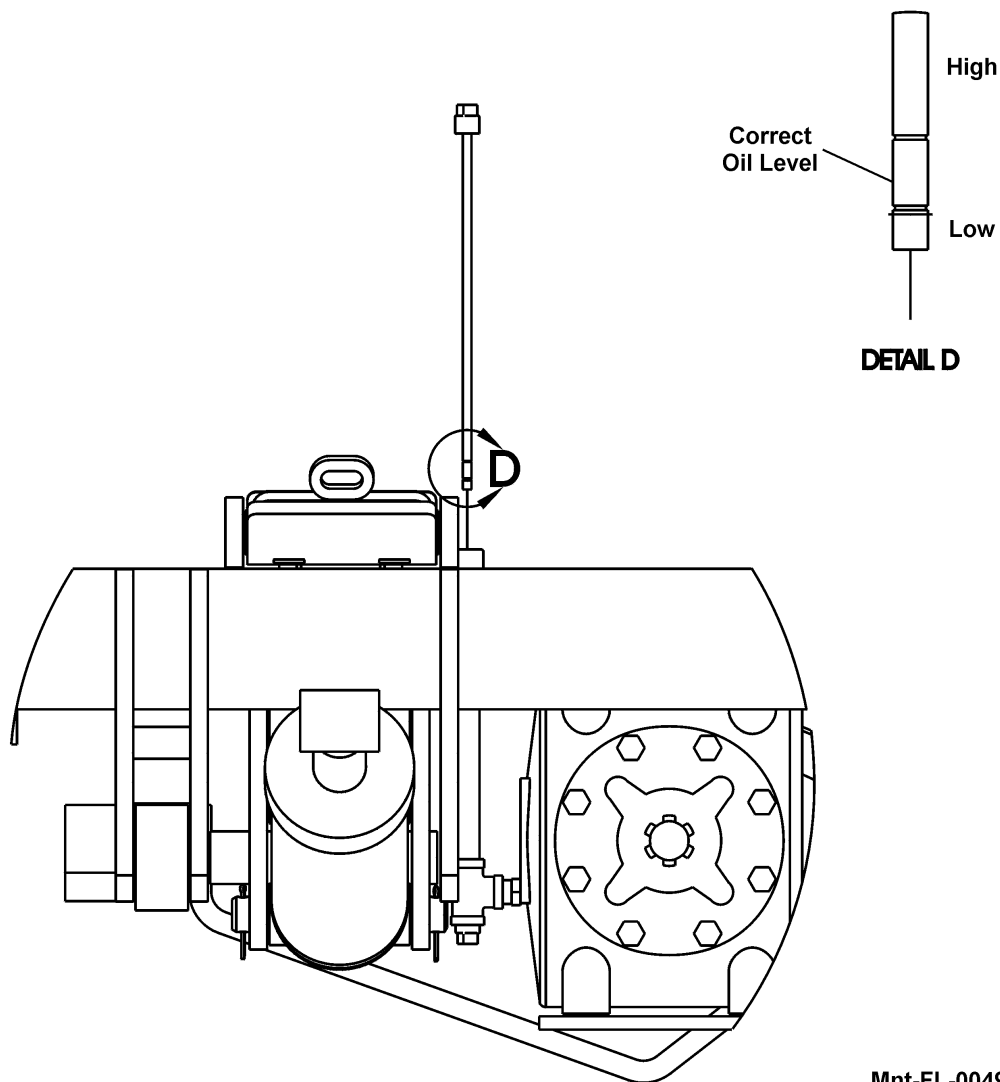
## Gearbox Oil Level

The Gearboxes have been filled with lubricant to the proper dipstick level prior to shipment. However, you should check the oil level dipstick before operating, and frequently thereafter. To check for accurate oil level on gearbox, run the cutter for a couple of minutes to allow the gearbox to warm up to at least 70° or 75° and allow the oil to run into the dipstick reservoir. This allows for proper oil level to be checked. Correct oil level should be between the two grooves on dipstick. Never fill gearbox with too much oil, damage to gearbox seals can occur. Refer to figure below for correct oil level.

**NOTE:** Overfilling the Gearbox will cause pressure to build up and cause Oil Seals to leak.

**ATTENTION:** If the Gearbox suddenly starts making an unusual noise, stop at once, check for leaks, and refill Gearbox as required.

Recommended lubricant is Multi-Purpose Gear Oil (P/N 00786250). Center box capacity is 2-1/2 Quarts.

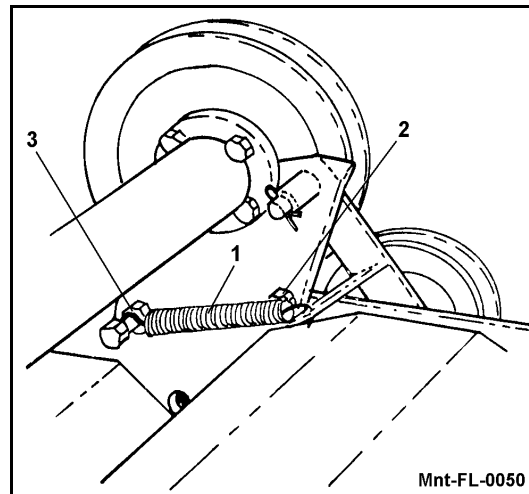


Mnt-FL-0049

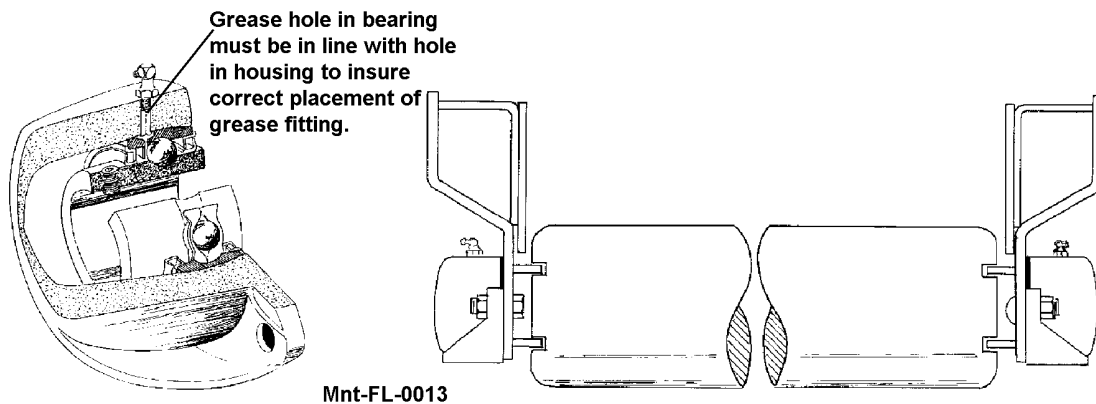
# MAINTENANCE

## REPLACING CUTTER UNIT DRIVEBELTS

1. Place unit on ground or support securely.
2. Remove belt guard.
3. Remove idler arm spring (1).
4. Remove extension shaft housing mounting bracket front bolt (2) and loosen rear bolt (3).
5. Pivot extension shaft housing mounting bracket assembly. Remove old belts and install new ones.
6. Reinstall front mounting bolt then secure extension shaft housing mounting bracket to unit.
7. Reinstall idler arm spring and belt guard.



## ROLLER BEARING REPLACEMENT



Securely support mower while removing and installing roller assembly.

1. Remove roller and both bearing and bracket assemblies from mower. Lift the mower only high enough to remove the roller assembly.  
If installing a roller with pre assembled bearing and bracket assemblies, remove the old roller, proceed to step 11.
2. Slide bearing and bracket assemblies off each end of roller.  
If replacing with new bearing and bracket assemblies, proceed to step 9.
3. Remove roller bearing and housing assembly attaching hardware. Remove assembly from bracket. Inspect seal between assembly and bracket for brittleness, cracks, wear and tear. Replace if necessary.  
If replacing with new roller bearing and housing assemblies, proceed to step 8.
4. Remove grease fitting from the top of bearing housing.
5. Remove bearing from housing by rotating Bearing 90° sideways and line up with notches in Bearing Housing then pull out.
6. Install new bearing into housing. Bearing must be installed with grease hole in bearing aligned with grease fitting hole in housing.

# MAINTENANCE

## MAINTENANCE

7. Reinstall grease fitting to housing. Grease Fitting must have locking pin installed which inserts into grease hole in bearing when installed. If Grease Fitting does not have a pin, order a new grease fitting. Grease fitting must be tight and seated in grease hole in bearing to prevent bearing from rotating in housing.
8. Attach roller bearing and housing assembly to bracket with seal between housing and bracket.
9. Slide bearing and bracket assemblies on each end of roller.
10. Check bearing for proper installation in housing by gently rocking bearing and bracket assembly in end of roller. Play should be slight to none at all.
11. Install roller and bearing and bracket assemblies on mower.
12. Lubricate roller bearing until lubricant can be seen coming out between roller and bearing housing.

## CUTTERSHAFT BEARING REPLACEMENT

### OUTBOARD (DRIVE) BEARING

#### For Rear Head Non Driveside Bearing and Wing Inboard Bearing Replacement:

1. Lift cutter unit to maximum horizontal height; then, securely support ends of cutterhousing.
2. Remove enough knives to place a floor jack under center of cuttershaft.
3. Securely support cuttershaft.

**NOTE:** The cuttershaft must remain supported while changing bearings.

4. Remove outboard fender-outboard bearings or wing drivelines-wing inboard bearings. Loosen setscrews securing bearing inner race to cuttershaft. Use special 3/16 hex allen wrench which has been shortened to reach into bearings.
5. Remove fasteners securing bearing and housing assembly to cutterhousing; then remove bearing and housing assembly.

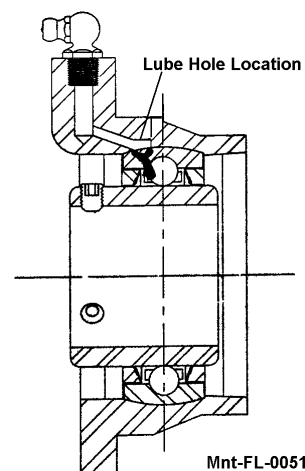
**NOTE:** There are two tapped holes in the housing which can be used to pull bearing and housing assembly out by using special tool No. 701627.

6. Using a jack to hold up cuttershaft in proper alignment, install bearing and housing assembly to cutter unit and make certain that bearing setscrew is located in keyway on cuttershaft. Grease bearing and install cap over fitting.

**NOTE:** Make sure grease is getting into bearing.

7. Replace outboard fender or wing driveline. Make sure to time wing drivelines properly before reconnecting.

**NOTE:** Grease Lube Hole in bearing outer race must align with lube hole in housing. Inboard or Drive Side Bearing cannot be used as Outboard Bearing.



# MAINTENANCE

## MAINTENANCE

### CENTER SECTION INBOARD BEARING REPLACEMENT

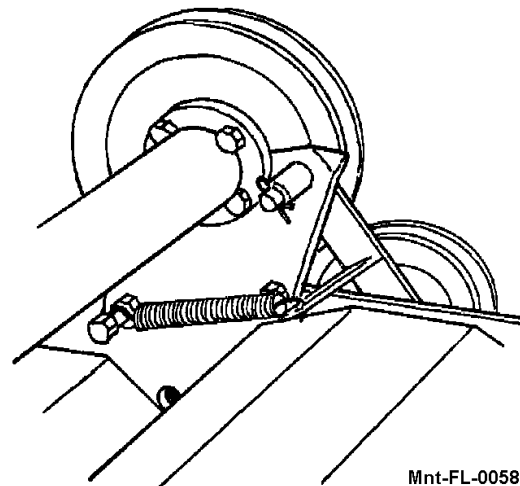
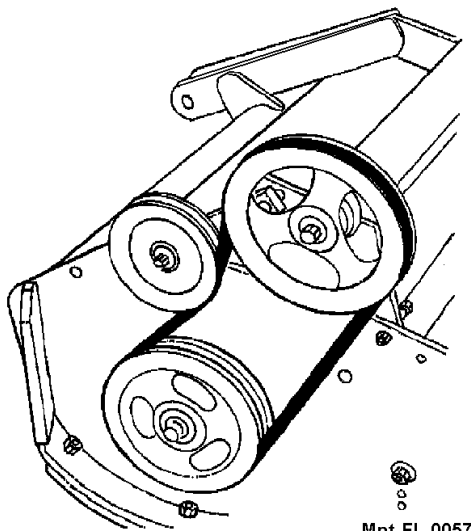
1. Lift cutter unit to maximum horizontal height; then, securely support ends of cutter housing.
2. Remove enough knives to place a floor jack under center of cuttershaft.
3. Securely support cuttershaft. **IMPORTANT:** The cuttershaft must remain supported while changing bearings. **NOTE:** Steps 4, 5, & 6 are for rear head only.
4. Remove Belt Guard.
5. Remove spring from idler arm.
6. Remove extension shaft housing mounting bracket fasteners at the cutterhousing. Pivot mounting bracket assembly and remove drive belt.
7. Remove fasteners that secure pulley or driveline flange to cuttershaft. Remove pulley or driveline flange and key.
8. Remove fasteners securing inboard bearing and housing assembly to cutterhousing; then, remove bearing and housing assembly.

**NOTE:** There are two tapped holes in the housing which can be used to pull bearing and housing assembly out by using special tool No. 701627.

9. Using a jack to hold cuttershaft in proper alignment, install inboard bearing and housing assembly to cutter unit. Grease bearing and instal cap over fitting.

**NOTE:** Make sure grease is getting into bearing.

10. Reinstall key and pulley. Secure with cuttershaft fasteners.
11. Remove jack and check shaft rotation. Reinstall knives which were removed.
12. Reinstall drive belts then secure motor mounting bracket to cutterhousing.
13. Reinstall idler arm spring.
14. Reinstall belt guard.
15. Remove supports, lower unit to ground and test unit.



# MAINTENANCE

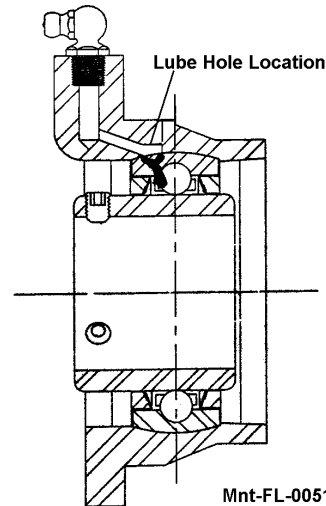
## MAINTENANCE

### CUTTERSHAFT REPLACEMENT

**NOTE:** It is recommended that cuttershaft bearing and housing assemblies be replaced when replacing cuttershaft.

1. Place unit on the ground or securely support at a convenient height.
2. Remove cuttershaft bearing and housing assemblies as in Cuttershaft Bearing Replacement. After removing both assemblies, the cuttershaft can be removed and a new one installed. It may be necessary to remove two sets of knives nearest the drive end of cuttershaft.
3. Install new bearing and housing assemblies.

**NOTE:** Lube hole in bearing outer race must align with hole in housing. Outboard bearing cannot be used on inboard side. Set screws are not required for Inboard Bearing.



INBOARD (Drive Side) Bearing

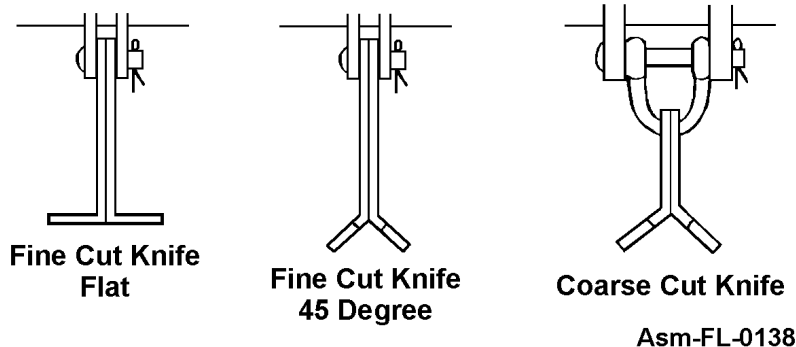
### CUTTER KNIVES

Cutter knives are attached to the cutter shaft with hardened knife pins and cotter pins. These pins are supplied with the knife kit. To replace existing knives, remove and discard used pins and install new knives using new pins. Knife pins must be installed in certain direction to locate cotter pins where knives will not reach them when flexing backward. After installing cotter pins, bend extended prong at a 45 degree angle.

**FOR FORWARD ROTATION:** On the right wing and center unit, all knife pins must be installed with their heads facing away from the cuttershaft pulley. On the left wing, the heads of the knife pins must face the cuttershaft pulley.

**FOR REVERSE ROTATION:** On the right wing and center unit, all knife pins must be installed with their heads facing toward the cuttershaft pulley. On the left wing, the heads of the knife pins must face away from the cuttershaft pulley.

### FLAIL CUTTER KNIVES





# MAINTENANCE

## Sharpening

These Alloy Knives can be sharpened by filing or grinding. If by grinding, keep cool to maintain hardness and avoid early dulling. When sharpening, remove metal mostly at the end of the tip and not much next to the shank. This will make the cutting portion taper rather than long and weak after several sharpenings. If the Rhino Electric Grinder is used, the knives can be sharpened without removing from the machine. Sharp knives require less power than dull knives. Sharp knives do a better job than dull knives. Replace broken or missing knives promptly!

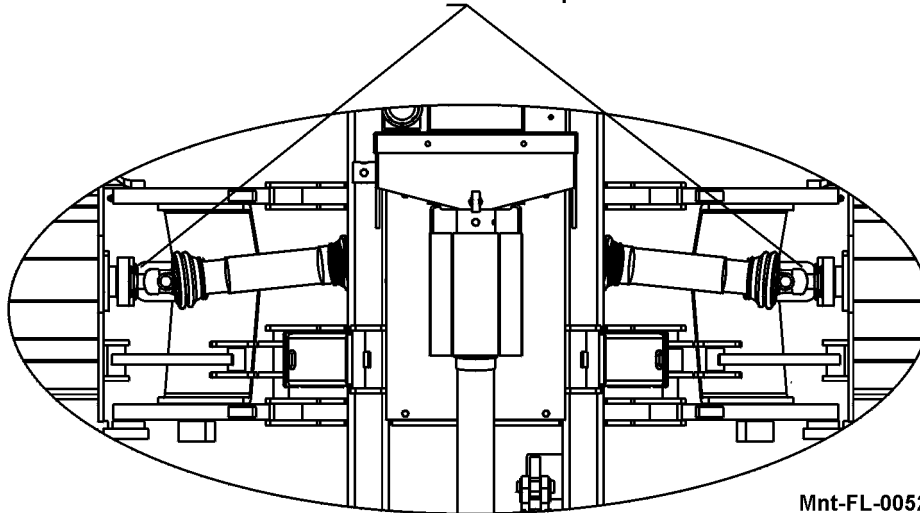
## Straightening

These Alloy Spring Steel Knives are tough and will bend quite far before they break, and can be straightened several times if bent slightly from hitting obstructions. Use two pairs of pliers or Eavesdrops™ or Special tools. Replace any broken or cracked blade at once to prevent the knife's flying off causing imbalance and vibration or possible serious bodily injury.

## WING DRIVELINE TIMING

Wing drivelines must be timed (left and right driveline yokes must be orientated at same position) with one another to prevent damage to the driveline and gearbox when raising mower wings. If for any reason a wing driveline must be disconnected make certain to orientate driveline yokes at same orientation as opposite driveline wing when reconnecting.

Wing Drivelines must be timed to prevent damage when raising Mower Wings.  
Install Driveline with Yoke at same position as shown.



Mnt-FL-0052

## PROPER TORQUE FOR FASTENERS

The chart lists the correct tightening torque for fasteners. When bolts are to be tightened or replaced, refer to this chart to determine the grade of bolts and the proper torque except when specific torque values are assigned in manual text.

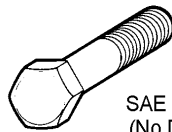
RECOMMENDED TORQUE IN FOOT POUNDS UNLESS OTHERWISE STATED IN THE MANUAL\*

**NOTE:** These values apply to fasteners as received from supplier, dry or when lubricated with normal engine oil. They do not apply if special graphited or molydisulphide greases or other extreme pressure lubricants are used. This applies to both UNF fine and UNC coarse threads.

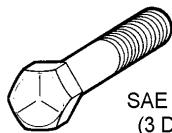
# MAINTENANCE

## TORQUE SPECIFICATIONS

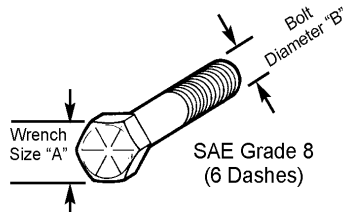
### AMERICAN Bolt Head Markings



SAE Grade 2  
(No Dashes)



SAE Grade 5  
(3 Dashes)

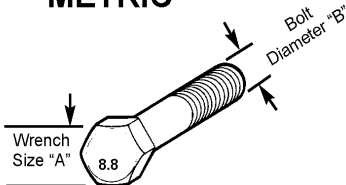


SAE Grade 8  
(6 Dashes)

Proper torque for American fasteners.  
Recommended Torque in Foot Pounds (Newton Meters).\*

WRENCH SIZE (IN.) "A"	BOLT DIAMETER (IN.) "B" AND THREAD SIZE	SAE GRADE 2	SAE GRADE 5	SAE GRADE 8
7/16	1/4 - 20 UNC	6 (7)	8 (11)	12 (16)
7/16	1/4 - 28 UNF	6 (8)	10 (13)	14 (18)
1/2	5/16 - 18 UNC	11 (15)	17 (23)	25 (33)
1/2	5/16 - 24 UNF	13 (17)	19 (26)	27 (37)
9/16	3/8 - 16 UNC	20 (27)	31 (42)	44 (60)
9/16	3/8 - 24 UNF	23 (31)	35 (47)	49 (66)
5/8	7/16 - 14 UNC	32 (43)	49 (66)	70 (95)
5/8	7/16 - 20 UNF	36 (49)	55 (75)	78 (106)
3/4	1/2 - 13 UNC	49 (66)	76 (103)	106 (144)
3/4	1/2 - 20 UNF	55 (75)	85 (115)	120 (163)
7/8	9/16 - 12 UNC	70 (95)	109 (148)	153 (207)
7/8	9/16 - 18 UNF	79 (107)	122 (165)	172 (233)
15/16	5/8 - 11 UNC	97 (131)	150 (203)	212 (287)
15/16	5/8 - 18 UNF	110 (149)	170 (230)	240 (325)
1-1/8	3/4 - 10 UNC	144 (195)	266 (360)	376 (509)
1-1/8	3/4 - 16 UNF	192 (260)	297 (402)	420 (569)
1-5/16	7/8 - 9 UNC	166 (225)	430 (583)	606 (821)
1-5/16	7/8 - 14 UNF	184 (249)	474 (642)	668 (905)
1-1/2	1 - 8 UNC	250 (339)	644 (873)	909 (1232)
1-1/2	1 - 12 UNF	274 (371)	705 (955)	995 (1348)
1-1/2	1 - 14 UNF	280 (379)	721 (977)	1019 (1381)
1-11/16	1-1/8 - 7 UNC	354 (480)	795 (1077)	1288 (1745)
1-11/16	1-1/8 - 12 UNF	397 (538)	890 (1206)	1444 (1957)
1-7/8	1-1/4 - 7 UNC	500 (678)	1120 (1518)	1817 (2462)
1-7/8	1-1/4 - 12 UNF	553 (749)	1241 (1682)	2013 (2728)
2-1/16	1-3/8 - 6 UNC	655 (887)	1470 (1992)	2382 (3228)
2-1/16	1-3/8 - 12 UNF	746 (1011)	1672 (2266)	2712 (3675)
2-1/4	1-1/2 - 6 UNC	870 (1179)	1950 (2642)	3161 (4283)
2-1/4	1-1/2 - 12 UNF	979 (1327)	2194 (2973)	3557 (4820)

### METRIC



Numbers appearing on bolt heads  
indicate ASTM class.

\*Use 75% of the specified torque value for plated fasteners. Use 85% of the specified torque values for lubricated fasteners.

Proper torque for Metric fasteners.  
Recommended torque in Foot Pounds (Newton Meters).\*

WRENCH SIZE (mm) "A"	BOLT DIA. (mm) "B"	ASTM 4.6	ASTM 8.8	ASTM 9.8	ASTM 10.9
8	5	1.8 (2.4)		5.1 (6.9)	6.5 (8.8)
10	6	3 (4)		8.7 (12)	11.1 (15)
13	8	7.3 (10)		21.1 (29)	27 (37)
16	10	14.5 (20)		42 (57)	53 (72)
18	12	25 (34)	74 (100)	73 (99)	93 (126)
21	14	40 (54)	118 (160)	116 (157)	148 (201)
24	16	62 (84)	167 (226)	181 (245)	230 (312)
30	20	122 (165)	325 (440)		449 (608)
33	22		443 (600)		611 (828)
36	24	211 (286)	563 (763)		778 (1054)
41	27		821 (1112)		1138 (1542)
46	30	418 (566)	1119 (1516)		1547 (2096)

Mnt-B-0005

# MAINTENANCE

## General Information on Flail Mower Vibration

### FLAIL MOWERS INFORMATION BULLETIN NO. 5

#### EXCESSIVE VIBRATION

Vibration is a **MONSTER** and if allowed to continue unchecked, can cause the complete break-up of a machine in a very short time.

A properly operated Flail Mower will produce very little vibration. If vibration does occur, the mower should be stopped and the trouble corrected, as warranty does not cover failures resulting from continued operation after something happens to cause the mower to vibrate excessively.

Vibration is caused by a rotating part which is out of balance. This could be the cutter shaft or, on those models having a universal slip joint assembly drive shaft, from the drive shaft.

If the two extreme ends of the drive shaft, (the splined yokes which fit on the tractor power take off shaft and on the mower gear box driven shaft), are not parallel, vibration will be evident.

This is because of the mechanics of a universal drive wherein the rotational speed through a universal joint is not uniform. If the ends of a universal drive shaft are parallel, the uneven rotation effect is cancelled out and the machine being driven will be driven at a uniform rate of speed. However, if the ends are not parallel, the uneven rotation effect may be multiplied, resulting in a speeding up and slowing down of the entire mower system (gear box, extension shaft, pulleys, belt, and cutter shaft) each revolution. This effect can be readily noticed if the mower, while running, is raised to an extreme height on the tractor lift.

For smoothest operation, the tilt of the mower should be adjusted (on a 3-point hitch, by adjusting the length of the top link between the tractor and the mower) so that the ends of the drive shaft are parallel when the mower is down in operating position. Raising the mower, while running, to extreme heights on the lift should be avoided.

To check where the vibration is originating, first be sure the ends of the universal drive shaft are parallel. Then, if vibration is still present, remove the drive belt and run the mower. If vibration is still present, it most likely is coming from and caused by a bent drive shaft. If so, the shaft should be replaced or straightened. If the vibration is gone - the drive portion of the mower is running smoothly - then the vibration is probably coming from the cutter shaft (it could be a pulley out of balance or a faulty belt with a varying cross section, but this is not likely).

The cutter shaft will run out of balance if:

1. Wire, rope, string, rags, etc., around the cutter shaft, are holding the knives in a folded back position. Remove such foreign objects and be sure all knives are free to swing to the extended position.

2. (a) Knives are missing or broken. Replace missing or broken knives.

(b) Knife hanger lugs are broken off shaft. This condition usually results from continued operation in contact with large hard objects where the knife hanger lugs themselves are hitting the hard objects. Lugs should be replaced using arc welding equipment so as not to direct too much heat in one area of the shaft.

3. Cutter shaft ball bearings are worn enough to have radial "play" in them. Replace ball bearing and other worn parts to eliminate "play".

4. Shaft is bent. The shafts are straight within a couple of thousandths of an inch when they are made. It is possible that they will become bent in use, such as if the shaft is hooked on a stump while the tractor is moving forward at a good speed.

5. Shafts are operated at improper speed. Rotating shafts have what is known as a natural period of vibration. The same is true of the cutter shafts on the Flail Mowers.

# MAINTENANCE

The actual speed at which the harmonic will occur will vary with each mower and each installation. To avoid this harmonic vibration when operating the mower, it may be necessary to adjust the engine speed of the tractor up or down.

Some units have a harmonic which occurs below the nominal operating speed. On these units, it will be noticed that there is always a little vibration at a particular RPM as the mower is being sped up to operating speed. This occurs as the shaft passes through its normal harmonic vibration point. As long as the mower is opened at the proper speed, then harmonic vibration will not be an issue.

MAINTENANCE

<b>⚠ WARNING</b>	<b>⚠ ADVERTENCIA</b>
<p><b>Non-genuine parts can fail catastrophically. TO AVOID SERIOUS INJURY OR DEATH:</b></p> <ul style="list-style-type: none"> <li>• ONLY use genuine RHINO replacement parts.</li> <li>• Non-genuine parts can fail creating hazardous conditions for operator and bystanders.</li> </ul> <p>Contact local dealer or RHINO about repair parts at:</p> <p>1020 S. Sangamon Ave., Gibson City, IL 60936          Customer Service: 800-446-5158.          Email: <a href="mailto:parts@servis-rhino.com">parts@servis-rhino.com</a></p> <p style="text-align: right;">00760657_A</p>	<p><b>Partes que no son auténticas pueden fallar catastróficamente. PARA EVITAR LESION SERIA O MUERTE:</b></p> <ul style="list-style-type: none"> <li>• Use SOLAMENTE las partes de reemplazo auténticas de RHINO.</li> <li>• Partes que no son auténticas pueden fallar y causar condiciones peligrosas para el operador y personas presentes.</li> </ul> <p>Contacte a su distribuidor local o RHINO sobre partes de reparo a:</p> <p>1020 S. Sangamon Ave., Gibson City, IL 60936          Servicio al Cliente: 800-446-5158.          Correo Electronico: <a href="mailto:parts@servis-rhino.com">parts@servis-rhino.com</a></p>
<b>IMPORTANT</b>	<b>IMPORTANTE</b>
<p><b>BE AWARE      BE TRAINED</b>  <b>BE ALERT      Before Operating</b>  <b>BE ALIVE      this Mower</b></p>	<p><b>ESTE CONSCIENTE      SEA ENTRENADO</b>  <b>ESTE ALERTO      Antes de Funsionar</b>  <b>ESTE VIVO      Cortacésped</b></p>
<p>To prevent serious injury to yourself and/or bystanders, be trained in Safe Mowing Practices.</p> <p>Alamo Group Companies, Alamo Industrial, Bush Hog, M&amp;W, Rhino, Schulte and Tiger as well as AEM and FEMA provide training material that is critical for your Safety and the Safety of others when operating this equipment. Make these Safety Procedures an important part of every workday.</p> <p>Read and understand the Operator's Manual.</p> <p>Do not let untrained individuals operate this equipment.</p> <p>Contact your Dealer, AEM (<a href="http://www.aem.org">www.aem.org</a>), FEMA (314-878-2304, <a href="http://www.FarmEquipment.org">www.FarmEquipment.org</a>), or Alamo Group (<a href="http://www.Alamogroup.com">www.Alamogroup.com</a>) for information on training material or courses that provide training in Safer Operating Practices for Mowers.</p>	<p>Para prevenir lesiones graves a usted y/o personas presentes, sea entrenado en la Practica de Segar Seguro.</p> <p>Companias de Alamo Group, Alamo Industrial, Bush Hog, M&amp;W, Rhino, Schulte y Tiger asi como AEM y FEMA proporcionan material para entrenar que es esencial para su seguridad y la seguridad de otros al operar este equipo. Haga estos procedimientos de seguridad una parte importante de su dia de trabajo.</p> <p>Lea y entienda el Manual de Operadores.</p> <p>No permita que personas sin entrenamiento funcionen este equipo.</p> <p>Contacte a su distribuidor, AEM (<a href="http://www.aem.org">www.aem.org</a>), FEMA (314-878-2304, <a href="http://www.FarmEquipment.org">www.FarmEquipment.org</a>), o Alamo Group (<a href="http://www.Alamogroup.com">www.Alamogroup.com</a>) para la informacion sobre el material de entrenamiento o cursos que ofrecen el entenamiento de Prácticas de Operación para Cortadoras.</p> <p style="text-align: right;">00760657_B</p>



# RHINO

## LIMITED WARRANTY

### 1. LIMITED WARRANTIES

- 1.01. Servis-Rhino warrants for one year from the purchase date to the original non-commercial, governmental, or municipal purchaser ("Purchaser") and warrants for six months to the original commercial or industrial purchaser ("Purchaser") that the goods purchased are free from defects in material or workmanship.
- 1.02. Manufacturer will replace for the Purchaser any part or parts found, upon examination at one of its factories, to be defective under normal use and service due to defects in material or workmanship.
- 1.03. This limited warranty does not apply to any part of the goods which has been subjected to improper or abnormal use, negligence, alteration, modification, or accident, damaged due to lack of maintenance or use of wrong fuel, oil, or lubricants, or which has served its normal life. This limited warranty does not apply to any part of any internal combustion engine, or expendable items such as blades, shields, guards, or pneumatic tires except as specifically found in your Operator's Manual.
- 1.04. Except as provided herein, no employee, agent, Dealer, or other person is authorized to give any warranties of any nature on behalf of Manufacturer.

### 2. REMEDIES AND PROCEDURES.

- 2.01. This limited warranty is not effective unless the Purchaser returns the Registration and Warranty Form to Manufacturer within 30 days of purchase.
- 2.02. Purchaser claims must be made in writing to the Authorized Dealer ("Dealer") from whom Purchaser purchased the goods or an approved Authorized Dealer ("Dealer") within 30 days after Purchaser learns of the facts on which the claim is based.
- 2.03. Purchaser is responsible for returning the goods in question to the Dealer.
- 2.04. If after examining the goods and/or parts in question, Manufacturer finds them to be defective under normal use and service due to defects in material or workmanship, Manufacturer will:
  - (a) Repair or replace the defective goods or part(s) or
  - (b) Reimburse Purchaser for the cost of the part(s) and reasonable labor charges (as determined by Manufacturer) if Purchaser paid for the repair and/or replacement prior to the final determination of applicability of the warranty by Manufacturer.

The choice of remedy shall belong to Manufacturer.

- 2.05. Purchaser is responsible for any labor charges exceeding a reasonable amount as determined by Manufacturer and for returning the goods to the Dealer, whether or not the claim is approved. Purchaser is responsible for the transportation cost for the goods or part(s) from the Dealer to the designated factory.

### 3. LIMITATION OF LIABILITY.

- 3.01. MANUFACTURER DISCLAIMS ANY EXPRESS (EXCEPT AS SET FORTH HEREIN) AND IMPLIED WARRANTIES WITH RESPECT TO THE GOODS INCLUDING, BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
- 3.02. MANUFACTURER MAKES NO WARRANTY AS TO THE DESIGN, CAPABILITY, CAPACITY, OR SUITABILITY FOR USE OF THE GOODS.
- 3.03. EXCEPT AS PROVIDED HEREIN, MANUFACTURER SHALL HAVE NO LIABILITY OR RESPONSIBILITY TO PURCHASER OR ANY OTHER PERSON OR ENTITY WITH RESPECT TO ANY LIABILITY, LOSS, OR DAMAGE CAUSED OR ALLEGED TO BE CAUSED DIRECTLY OR INDIRECTLY BY THE GOODS INCLUDING, BUT NOT LIMITED TO, ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES RESULTING FROM THE USE OR OPERATION OF THE GOODS OR ANY BREACH OF THIS WARRANTY. NOT WITHSTANDING THE ABOVE LIMITATIONS AND WARRANTIES, MANUFACTURER'S LIABILITY HEREUNDER FOR DAMAGES INCURRED BY PURCHASER OR OTHERS SHALL NOT EXCEED THE PRICE OF THE GOODS.
- 3.04. NO ACTION ARISING OUT OF ANY CLAIMED BREACH OF THIS WARRANTY OR TRANSACTIONS UNDER THIS WARRANTY MAY BE BROUGHT MORE THAN TWO (2) YEARS AFTER THE CAUSE OF ACTION HAS OCCURRED.

### 4. MISCELLANEOUS.

- 4.01. Proper Venue for any lawsuits arising from or related to this limited warranty shall be only in Guadalupe County, Texas.
- 4.02. Manufacturer may waive compliance with any of the terms of this limited warranty, but no waiver of any terms shall be deemed to be a waiver of any other term.
- 4.03. If any provision of this limited warranty shall violate any applicable law and is held to be unenforceable, then the invalidity of such provision shall not invalidate any other provisions herein.
- 4.04. Applicable law may provide rights and benefits to purchaser in addition to those provided herein.

### KEEP FOR YOUR RECORDS

ATTENTION: Purchaser should fill in the blanks below for his reference when buying repair parts and/or for proper machine identification when applying for warranty.

Servis-Rhino Implement Model \_\_\_\_\_ Serial Number \_\_\_\_\_

Date Purchased \_\_\_\_\_ Dealer \_\_\_\_\_

ATTENTION:

READ YOUR OPERATOR'S MANUAL

**RHINO®**

1020 S Sangamon Ave.

Gibson City, IL 60936

800-446-5158

Email: [parts@servis-rhino.com](mailto:parts@servis-rhino.com)





## TO THE OWNER/OPERATOR/DEALER

To keep your implement running efficiently and safely, read your manual thoroughly and follow these directions and the Safety Messages in this Manual. The Table of Contents clearly identifies each section where you can easily find the information you need.

The OCCUPATIONAL SAFETY AND HEALTH ACT (1928.51 Subpart C) makes these minimum safety requirements of tractor operators:

### REQUIRED OF THE OWNER:

1. Provide a Roll-Over-Protective Structure that meets the requirements of this Standard; and
2. Provide Seat belts that meet the requirements of this paragraph of this Standard and SAE J4C; and
3. Ensure that each employee uses such Seat belt while the tractor is moving; and
4. Ensure that each employee tightens the Seat belt sufficiently to confine the employee to the protected area provided by the ROPS

### REQUIRED OF THE OPERATOR:

1. Securely fasten seat belt if the tractor has a ROPS.
2. Where possible, avoid operating the tractor near ditches, embankments, and holes.
3. Reduce speed when turning, crossing slopes, and on rough, slick, or muddy surfaces.
4. Stay off slopes too steep for safe operation.
5. Watch where you are going - especially at row ends, on roads, and around trees.
6. Do not permit others to ride.
7. Operate the tractor smoothly - no jerky turns, starts, or stops.
8. Hitch only to the drawbar and hitch points recommended by the tractor manufacturer.
9. When the tractor is stopped, set brakes securely and use park lock, if available.

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- ☒ Keep children away from danger all day, every day...
  - ☒ Equip tractors with rollover protection (ROPS) and keep all machinery guards in place...
  - ☒ Please work, drive, play and live each day with care and concern for your safety and that of your family and fellow citizens.



**FX17/FX21  
FLEX FLAIL**